Five-Year Review Report

Second Five-Year Review Report
for
Kohler Company Landfill
Village of Kohler
Sheboygan County, Wisconsin

September 2007

PREPARED BY:

Wisconsin Department of Natural Resources
Southeast Region
Milwaukee, Wisconsin

Approved by:

Richard C. Karl, Director
Superfund Division, Region 5

Date: 9/29/07

Table of Contents

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CAMU	Corrective Action Management Unit
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CTH	County Trunk Highway
CFR	Code of Federal Regulations
ECA	Environmental Contamination Assessment
ESD	Explanation of Significant Difference
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PRP	Potentially Responsible Party
RA	Remedial Action
RAA	Remedial Action Alternatives
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager
ROD	Record of Decision
SDWA	Safe Drinking Water Act
TCE	Trichloroethylene
U. S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WDNR	Wisconsin Department of Natural Resources

[This page intentionally left blank.]

Executive Summary

The remedy for the Kohler Company Landfill site in Kohler, Wisconsin included construction of a multi-layered clay capping system over 50% of the waste fill area, installation of a ground water interceptor drain system, discharge of the collected drain water to the City of Sheboygan POTW for treatment, and monitored natural attenuation of contaminated groundwater that had already migrated beyond the waste mass. The site achieved construction completion with the signing of the Preliminary Close Out Report on September 23, 1998. The trigger for the first five-year review was the actual start of construction on June 9, 1997. The trigger for the second five-year review was the completion of the first five-year review in September 2002.

The assessment of this five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). At this time the landfill is 88% capped. One Explanation of Significant Difference (ESD) was issued on September 29, 1998, to allow a portion of the landfill to remain open until final grades were achieved and the site is capped in accordance with State code requirements. The remedy is functioning as designed.

All immediate threats for the source control operable unit at the site have been addressed and the remedy is expected to remain protective of human health and the environment. The landfill is being operated in accordance with the requirements of NR 500 to 520, Wisconsin Administrative Code. All immediate threats for the groundwater operable unit have been addressed at the site and the groundwater portion of the remedy is expected to be fully protective of human health and the environment after the groundwater cleanup goals are achieved through pumping and Monitored Natural Attenuation in an estimated 30 years. Institutional controls for source control and groundwater are required to ensure that there is no inappropriate use of the Site or groundwater. The remedy is currently functioning as intended because no inappropriate Site or groundwater uses are occurring. Because the remedial actions at of the operable units are protective, the site is protective of human health and the environment.

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate the effectiveness of the perimeter drain system in preventing contaminated liquids migration from the waste mass towards the river. Current data indicates that significant amounts of contaminants are being intercepted by the drain system. Additional sampling and analysis will be conducted on a regular basis as required. Marked improvements in the water quality of the upper aquifer indicate that the remedy is functioning as designed.

Long-term protectiveness also requires compliance with effective Institutional Controls (ICs). Compliance with effective ICs will be ensured through long-term stewardship by implementing, maintaining and monitoring effective ICs as well as maintaining the site remedy components. To ensure the remedy continues to function as designed, an institutional controls study and plan will be prepared.

[This page intentionally left blank.]

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Kohler Company Landfill Superfund Site		
EPA ID *(from WasteLAN)*: WID006073225		
Region: 5	**State:** WI	**City/County:** Kohler/Sheboygan

SITE STATUS	
NPL status: ☒ X Final __Deleted „Other (specify)	
Remediation status (choose all that apply): Under Construction Operating X Complete	
Multiple OUs?* X YES NO	**Construction completion date:** 09 / 29 / 1998
Has site been put into reuse? X YES __NO __ Portions	

REVIEW STATUS	
Lead agency: EPA X State Tribe Other Federal Agency	
Author name: Thomas A. Wentland	
Author title: Remedial Project Manager	**Author affiliation:** WDNR, Southeast Region
Review period:** 05 /23 /2007 to 09 /27 /2007	
Date(s) of site inspection: 05 /23 /2007	
Type of review: X Post-SARA Pre-SARA __NPL-Removal only Non-NPL Remedial Action Site NPL State/Tribe-lead Regional Discretion)	
Review number: ☒ __1 (first) X 2 (second) „3 (third) „Other (specify)	
Triggering action: Actual RA On-site Construction at OU #__ Actual RA Start at OU# __ Construction Completion X Previous Five-Year Review Report Other (specify)	
Triggering action date *(from WasteLAN)*: 9 / 20 / 2002	
Due date *(five years after triggering action date)*: 09 /20 /2007	

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

- A complete analysis of the institutional controls should be performed at the Site to assure that the remedy is functioning as intended with regard to the ICs.

- Long-term stewardship needs to be assured for the Site. This will be provided through preparation of an IC plan and appropriate follow-up.

Recommendations and Follow-up Actions:

- Complete an IC study for the Site within six months after the date of this Five-Year Review Report. Analysis of the institutional controls in place at the site is needed to assure effective ICs are in place so that the remedy continues to function as intended with regard to the ICs and to ensure effective procedures are in-place for long-term stewardship at the Site.

- Complete an Institutional Control Plan documenting necessary IC evaluation activities and necessary corrective measures. The IC plan is necessary to evaluate effectiveness of any existing ICs, to implement additional ICs and plan for long-term stewardship to ensure long-term protectiveness of the remedy.

Protectiveness Statement(s):

All immediate threats for the source control operable unit at the site have been addressed and the remedy is expected to remain protective of human health and the environment. The landfill is being operated in accordance with the requirements of NR 500 to 520, Wisconsin Administrative Code. All immediate threats for the groundwater operable unit have been addressed at the site and the groundwater portion of the remedy is expected to be fully protective of human health and the environment after the groundwater cleanup goals are achieved through pumping and monitored natural attenuation in an estimated 30 years. Institutional controls for source control and groundwater are required to ensure that there is no inappropriate use of the Site or groundwater. The remedy is currently functioning as intended because no inappropriate Site or groundwater uses are occurring. Because the remedial actions at of the operable units are protective, the site is protective of human health and the environment.

Long-Term Protectiveness:

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate the effectiveness of the perimeter drain system in preventing contaminated liquids migration from the waste mass towards the river. Current data indicates that significant amounts of contaminants are being intercepted by the drain system. Additional sampling and analysis will be conducted on a regular basis as required. Marked improvements in the water quality of the upper aquifer indicate that the remedy is functioning as designed.

Long-term protectiveness also requires compliance with effective ICs. Compliance with effective ICs will be ensured through long-term stewardship by implementing, maintaining and monitoring effective ICs as well as maintaining the site remedy components. To ensure the remedy continues to function as designed, an institutional controls study and plan will be prepared.

Kohler Company Landfill
Kohler, Wisconsin
First Five-Year Review Report

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

The Wisconsin Department of Natural Resources (WDNR) is preparing this five-year review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The U.S. EPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The WDNR conducted the five-year review of the remedy implemented at the Kohler Company Landfill in Kohler, Wisconsin. This review was conducted by the State Remedial Project Manager for the entire site from May 2007 through September 2007. This report documents the results of the review.

This is the second five-year review for the Kohler Company Landfill. The triggering action for this statutory review is the completion of the first five year review on September 20, 2002. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1 - Chronology of Site Events

Event	Date
Waste pits developed within the landfill for the disposal of waste oils and solvents	1950's - 1975
Disposal of all hazardous waste (by current definition under RCRA) at the landfill ceases	1980
Final listing on U.S EPA National Priorities List	9/21/1984
Kohler Company enters into an Administrative Order by Consent with the U.S. EPA	9/30/1985
Remedial Investigation/Feasibility Study (RI/FS) completed	1991
U.S. EPA splits site into 2 separate operable units (OU), one for source control and one for ground water	5/1991
ROD selecting a remedy for the source control operable unit (SCOU) is signed	3/30/1992
Wisconsin Department of Natural Resources assumes the role of lead agency for implementation of the SCOU remedy and selection of a remedy for the ground water operable unit (GWOU)	6/10/1992
Kohler Company submits Environmental Contamination Assessment (ECA)/Remedial Action Alternatives (RAA) report	11/9/1992
Plan modification approval from WDNR for the source control design	8/29/1995
ROD selecting a remedy for the GWOU is signed	6/26/1996
Plan modification approval from WDNR for revised SCOU design	7/10/1996
Work commences at the site for construction of the GWOU remedy (date that triggers a five-year-review)	6/9/1997
Work commences at the site for construction of the SCOU remedy	6/25/1997
Plan modification approval from the WDNR for the ground water monitoring plan	2/11/1998
Pre-final inspection of both operable units	8/12/1998
Explanation of Significant Difference (ESD) issued by U.S. EPA allowing for the continued filling of the landfill with non-hazardous solid waste until the site reaches final grades and is capped in accordance with State regulations	9/29/1998
Preliminary Close Out Report signed	9/29/1998
First Five Year Review	9/20/2002

III. Background

Physical Characteristics

The Kohler Company Landfill is located in the NE ¼ of the SE ¼ of Section 29, T15N, R22E, within the corporate boundaries of the Village of Kohler, Wisconsin. The Village of Kohler is a community of approximately 1,926 residents (2000 census), located in Sheboygan County. The landfill is situated on an

82 acre parcel of land that is bounded on the south, east and far west by the Sheboygan River, to the west and south by County Trunk Highway (CTH) "A" and to the north by CTH "PP". Approximately one-half of the permitted 82-acre parcel has been or is currently being used for waste disposal (See Attachment 1).

Land and Resource Use

The historic land use of the site was farming until the Kohler Company began waste filling in the 1950's. From the 1950's until 1975, activities at the site included waste oil and solvent disposal in pits dug into the waste mass. The majority of the waste is foundry sand, pottery cull and other miscellaneous solid waste from the adjacent Kohler Manufacturing Plant. The facility is still actively accepting non-hazardous industrial waste generated at the plant.

With the exception of the public right-of-ways for CTHs "A" and "PP", the Kohler Company currently owns all land surrounding the landfill. Most of the land adjacent to the Sheboygan River is undeveloped and part of the Kohler Company's River Wildlife Reserve. North of the landfill is the Kohler Company Manufacturing Plant and some areas north and west of the waste mass are currently used for landfill support activities including soil stockpiles and materials storage for beneficial reuse. The Sheboygan River is used for recreation and fishing. Access to the site itself is restricted through gates, dense vegetation and topography. Eighty-eight percent of the waste mass is contained beneath an impermeable cap, and all areas that had historically received hazardous waste (liquids or solids) have been covered.

The fractured dolomite aquifer underlying the site is used as a drinking water source, but there are no private wells near the landfill and strong upward gradients prevent contamination from migrating beyond the river. The dominant ground water flow direction in the shallow aquifer is east towards the Sheboygan River.

History of Contamination

The Kohler Company Landfill accepted mostly manufacturing waste from the Kohler Company plant including foundry sands, pottery cull, grinding dust and clay slurry. Between the 1950's and 1975, Kohler also disposed of various hydraulic oils, solvents, paint wastes, enamel powder and chrome plating sludges within pits dug out of the waste. Waste liquids seeped into the waste mass and soils surrounding the landfill causing contamination of soils and groundwater. Contamination in groundwater at the site consists primarily of volatile organic compounds (VOCs), including trichloroethylene (TCE) and vinyl chloride. Contaminants in soils and within the waste include polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), VOCs, and other organics and heavy metals. Rainfall on the uncapped landfill also caused contaminants to leach from the waste into the ground water. Seeps of contaminated liquids that drained into the Sheboygan River also developed at the southern toe of the landfill.

Initial Response

After reviewing data from the Kohler Company Landfill site, the WDNR recommended to the U.S. EPA that the site be included on the National Priorities List (NPL). The site was listed on the NPL in 1984 and, in 1985, the Kohler Company entered into an Administrative Order by Consent to prepare a remedial investigation and feasibility study (RI/FS) under the Comprehensive Response, Compensation and Liability Act (CERCLA). The RI/FS was completed in 1991 and Record of Decision (ROD) for the source control operable unit (SCOU) was finalized in 1992. The lead for the site was then passed to the WDNR for SCOU design and implementation and to finish the RI/FS for the ground water operable unit (GWOU). The ROD for the GWOU was finalized in 1996.

Basis for Taking Action

Contaminants
Hazardous substances that have been released at the site in each media include:

Waste	Groundwater
1,2-Dichloroethylene	Trichloroethylene
Trichloroethylene	Benzene
Benzene	1,1-Dichloroethane
Carbon disulfide	1,2-Dichloroethane
Ethylbenzene	Vinyl chloride
Toluene	Antimony
Xylene	Barium
Aluminum	Beryllium
Antimony	Cadmium
Arsenic	Chromium
Barium	
Beryllium	
Cadmium	
Chromium	
Cobalt	
Copper	
Fluoride	
Iron	
Lead	
Manganese	
Nickel	
Nitrate-nitrite	
Selenium	
Silver	
Sulfate	
Vanadium	
Zinc	
Phenol	
PAH's	

Exposures to waste, leachate, or contaminated groundwater are associated with significant human health risks, due to exceedance of EPA's risk assessment criteria for either the average or the reasonable maximum exposure scenarios. Risks from exposure to waste or leachate were significant due to the presence of various VOC's, semi-volatiles and metals. Potential risks associated with exposure to groundwater are attributed to the presence of a variety of VOC contaminants that exist at concentrations that exceed State and Federal Maximum Contaminant Levels.

IV. Remedial Actions

Remedy Selection

The ROD for the Source Control Operable Unit (SCOU) of the Kohler Company Landfill was signed on March 30, 1992, and the ROD for the Groundwater Operable Unit (GWOU) was signed on June 26, 1996. Remedial Action Objectives (RAOs) were developed as a result of data collected during the Remedial Investigations to aid in the development and screening of remedial alternatives to be considered for the RODs. The RAOs for the Kohler Company Landfill were divided into the following groups:

Source Control Response Objectives

- Minimize the migration of contaminants from the landfill that could degrade groundwater quality by reducing infiltration of liquids through the waste mass;
- Reduce risks to human health by preventing direct contact with, and ingestion of, contaminants in the waste mass and liquid disposal pits;
- Reduce risks to the environment by preventing direct contact with, and ingestion of, contaminants by eliminating the surface leachate seeps; and
- Minimize the migration of contaminants from the landfill that could result in surface water contaminant concentrations that could result in detrimental effects to the Sheboygan River ecosystem.

Ground Water Response Objectives

- Eliminate or minimize the threat posed to human health and the environment by preventing exposure to groundwater contaminants;
- Prevent further migration of groundwater contamination beyond its current extent; and
- Restore contaminated groundwater to Federal and State applicable or relevant and appropriate requirements (ARARs), including drinking water standards, and to a level that is protective of human health and the environment within a reasonable period of time.

The major components of the source control operable unit remedy selected in the ROD include the following:

1. Closure of the landfill;
2. Construction of a clay cap over the waste mass in accordance with State solid waste regulations;
3. Collection, treatment and discharge of landfill leachate via a toe drain collection system;
4. Operational and surface controls for the remaining period of landfill operation, and
5. Access and use restrictions on the property.

The major components of the ground water operable unit remedy selected in the ROD include:

1. Installation of a perimeter drainage system along the eastern and southern toes of the waste mass to intercept all contaminated liquids originating from the landfill;

2. Discharge of all liquids collected from the perimeter drain system into a force main connected to the City of Sheboygan Publicly-Owned Treatment Works (POTW) for treatment and disposal;

3. Use of monitored natural attenuation to achieve groundwater cleanup levels in areas beyond the perimeter drain;

4. Groundwater monitoring of existing and newly installed monitoring wells on the Kohler Company property and,

5. Five-year site reviews to assess site conditions, contaminant distributions, and any associated site hazards.

An Explanation of Significant Differences (ESD) was issued on September 29, 1998. The original source control ROD did not address that fact that the landfill would remain open until it reached final grades estimated to occur in the year 2015. The Kohler Company had placed final cover on over 50 percent of the landfill and proposed phasing in construction of the balance of the landfill cap as filling reached final grades. U.S. EPA approved the recommended change in the 1998 ESD. The primary changes documented in the ESD were:

- Permitting continued non-hazardous waste filling within the limits of the existing landfill, and

- Phased construction of the clay cap as the landfill reaches approved final grades.

Remedy Implementation

The remedial design and remedial action phase of the project was conducted through State solid waste management authority granted through ch. NR 500-526 of the Wisconsin Administrative Code. WDNR issued a Conditional Plan Modification Approval for design and construction of the SCOU on August 29, 1995 to the Kohler Company. A second Conditional Plan Modification Approval was issued by the WDNR on July 10, 1996, for implementation of the GWOU remedial design. As the sole responsible party (RP) for the Kohler Company Landfill, the Kohler Company paid all costs for construction and maintenance of the remedy. The Remedial Design (RD) was conducted in conformance with the RODs as modified by the ESD.

The Remedial Action (RA) consisted of two separate construction activities, one for the SCOU and one for the GWOU. Construction of the SCOU entailed installing a clay cap system on 50 percent of the waste mass, including the eastern and southern sideslopes. The activities for the SCOU phase were initiated on June 25, 1997, and were completed August 12, 1998. The major components of this phase of the RA were the following:

- Consolidating and regrading the waste mass;

- Placement and compaction of at least 2 feet of clay overlain by 18 inches of rooting zone material and topsoil;

- Seeding and mulching the finished slopes; and,

- Installation of surface water management measures (i.e. ditches, culverts, rip-rap).

Construction of the GWOU entailed installation of a perimeter drain system placed at the toe of the eastern and southern toes of the landfill. Activities for the GWOU phase of the RA were formally initiated on June 9, 1997 and work on the system was considered complete by December 1, 1997, when the pumps were activated. Major components for this phase of the RA include the following:

- Excavation of a ditch along the eastern and southern perimeter of the landfill;
- Placement of drainage pipe connected to 4 sumps and backfilling of the ditch with stone and soil;
- Installation of a force main connected to the sewage system to direct discharge from the perimeter drain to the Sheboygan POTW for treatment;
- Installation of control panels at each sump to regulate operation of the pumps;
- Replacement of monitoring wells that were abandoned due to remedial construction; and,
- Establishment of a ground water monitoring system.

The contractors for the Kohler Company conducted remedial activities as planned and the WDNR and the U.S. EPA conducted a pre-final inspection on August 12, 1998. During this period, just over 50 percent of the landfill was capped with 2 feet of compacted clay, topsoiled and seeded. An approximately 1,200-foot long perimeter drainage system was installed around the southern and eastern perimeter of the landfill. The pre-final inspection concluded that construction had been completed in accordance with the remedial design plans and specifications.

The site achieved construction completion status when the Preliminary Close-Out Report was signed on September 29, 1998.

The WDNR and U.S. EPA have determined that all RA construction activities were performed according to specifications. It is expected that cleanup levels for all groundwater contaminants will have been reached within approximately thirty years. After groundwater cleanup levels have been met and the landfill closes after reaching final grades, the WDNR and U.S. EPA will issue a Final Close-Out Report.

Institutional Controls

Institutional controls are required to ensure the protectiveness of the remedy. Institutional controls are non-engineered instruments such as administrative and legal controls that help to minimize the potential for exposure to contamination and protect the integrity of the remedy. Institutional controls are required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE).

As stated previously, the active portion of the landfill will remain open until the facility achieves its final grade as specified in the approved State closure plan and will then be closed subject to State closure rules under chapters NR 500-520, Wisconsin Administrative Code. Additionally, the March 30, 1992 ROD requires as part of the selected remedy the use of institutional/operational and surface controls; zoning and deed restrictions; and, effective security control measures. As stated in the March 1992 ROD, ICs will be relied on to provide additional effectiveness to the remedy. Deed and use restrictions will be implemented to prohibit excavation, construction or other activities on or near the landfill which could interfere with the remedy.

Table 2 - Summary of Institutional Controls for Restricted Areas.

Media, remedy components & areas that do not support UU/UE based on current conditions	*Objectives of IC*	*Title of Institutional Control Instrument Implemented*
Landfill – Capped Area	Prohibit use except maintenance and assure integrity of the landfill cap.	Permit in place for landfill. ICs will be evaluated.
Groundwater – On Site current area that exceeds groundwater cleanup standards	Prohibit groundwater use until cleanup standards are achieved.	ICs will be evaluated.
Other Remedial Action Components	Prohibit inconsistent uses and protect the integrity of the remedy components.	Will be evaluated.

Maps which depict the current conditions of the site and areas which do not allow for UU/UE will be developed as part of the IC evaluation activities discussed below.

Long-term stewardship must be assured which includes implementing, maintaining and monitoring effective ICs. An IC study will be requested from the PRP. An institutional control study will be undertaken for the Site to review the effectiveness and enforceability of the ICs. Please refer to Section IX for additional information regarding the assessment of institutional controls in place at this site and recommended further actions.

The IC study will require specific IC evaluation activities. Those evaluation activities include: providing information on whether any ICs have been implemented or there are plans to implement ICs, evaluating the effectiveness of existing ICs and proposing additional ICs if needed including evaluating whether the Site would benefit from the use of the Uniform Environmental Covenants Act (UECA) for the ICs, performing title work to confirm ownership and whether prior-in-time encumbrances may interfere with the ICs, preparing maps (paper and GIS), as well as planning for long-term stewardship as discussed below.

Once the IC evaluation activities have been completed, an IC plan will be developed by U.S. EPA within 6 months of the five-year review report and will include steps necessary to ensure that effective ICs are implemented, monitored and maintained. The IC Plan will incorporate the results of the evaluation plan for additional IC evaluation activities as needed including planning for IC implementation and long-term stewardship as discussed below.

Current Compliance: Access to the site is restricted by a fence. Additionally, a security guard is located at the gate of the facility. Based on inspections and interviews, U.S. EPA is not aware of site or media uses which are inconsistent with the stated objectives of the ICs. The remedy appears to be functioning as intended.

Long-Term Stewardship: Long-term protectiveness at the site requires compliance with use restrictions to assure the remedy continues to function as intended. To assure proper maintenance and monitoring effective ICs, long term stewardship procedures will be reviewed and a plan developed. The plan would include regular inspection of ICs at the site and annual certification to U.S. EPA that ICs are in place and

effective. Additionally, use of a communications plan and use of one-call system should be explored for long-term stewardship.

System Operation/Operation and Maintenance

The Kohler Company is conducting long-term monitoring and maintenance activities according to the SCOU and GWOU Conditional Plan Modification Approvals and the Ground Water Monitoring Approval issued by the WDNR. The primary activities associated with operations and maintenance (O&M) includes the following:

- Visual inspection of the cap with regard to vegetative cover, settlement, stability, and any need for corrective action;
- Inspection of the drainage swales and ditches for blockage, erosion and instability, and any need for corrective action;
- Inspection of the condition of groundwater monitoring wells, collection sumps, force main, and control panels;
- Environmental monitoring: Quarterly monitoring of groundwater quality with leachate monitoring done in accordance with the approvals and POTW permit conditions; and,
- Annual reports to the WDNR documenting the operation of the remedy.

The other remaining component of cleanup is the natural attenuation of ground water beyond the perimeter drain system. By capping the landfill and intercepting contaminated liquids before they can leave the waste fill limits, the source of ground water contamination beyond the drain system has been contained. Therefore, as indicated in the planned elements above, the primary O&M activities have been geared towards maintaining an operational drain system, monitoring ground water, and maintenance of the cap.

O&M costs include cap and perimeter drain maintenance, sampling and monitoring efforts, monitoring well maintenance, and discharge payments to the Sheboygan POTW. Not including extraordinary repair and replacement costs, the O&M costs are around $ 75,000 to $ 135,000 per year.

Table 3 - Annual System Operations/O&M Costs

Year	Total Cost to Nearest $1,000
1998	$ 181,000.00
1999	$ 105,000.00
2000	$ 63,000.00
2001	$ 65,000.00
2002	$ 135,000.00
2003	$ 75,000.00
2004	$ 135,000.00
2005	$ 75,000.00
2006	$ 135,000.00

V. Progress Since the Last Five-Year Review

Since the completion of the RA, the Kohler Company caps approximately one acre of the landfill every other year. Presently 46 acres of the 52 acre landfill have received a final cover. The remaining six acres of the landfill are active but are scheduled for closure by 2015. In 2005, the WDNR approved a Beneficial Reuse Plan for the Kohler Company Landfill which identifies waste streams that are diverted to beneficial reuse instead of being disposed of in the landfill. Since the Kohler Company has implemented the Beneficial Reuse Program, they have realized an annual reduction of 5,000 to 8,000 cubic yards of waste being disposed of in the landfill. It is estimated that these reductions will extend the life of the landfill until the year 2015.

VI. Five-Year Review Process

Administrative Components

WDNR staff met with representatives of the Kohler Company on May 23, 2007, to conduct an inspection of the Kohler Company Landfill in conjunction with the five-year review. The five-year review for the Kohler Company Landfill was conducted by Thomas Wentland of the WDNR, Remedial Project Manager (RPM) for the Kohler Company Landfill.

From April 1, 2007 to September 1, 2007, the reviewer established a review schedule whose components included:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review Report Development and Review.

Community Involvement

Activities to involve the community in the five-year review were initiated with a public notice prepared by the WDNR published in the Sheboygan Press newspaper on July 29, 2007, informing people that a five-year review was to be conducted at the Kohler Company Landfill. The notice invited members of the public to submit any comments to Wisconsin Department of Natural Resources. There were no responses to the public notice.

Document Review

This five-year review consisted of a review of relevant documents including O&M records and monitoring data. Applicable groundwater cleanup standards, as listed in the 1996 Record of Decision, were reviewed.

Data Review

Ground Water Monitoring

Ground water monitoring has been conducted at the Kohler Company Landfill since the early 1980s. Ground water quality data from the site is spotty prior to initiation of the remedial action, but what data was available indicated that contamination was present in significant quantities in both the shallow and

deep aquifers beneath the site. The shallow (alluvial sediments) and deep (fractured Silurian-aged dolomite) aquifers are seperated by a laterally discontinuous stratum of varved lacustrian clay.

Significant portions of the existing ground water monitoring network had to be removed to accommodate construction of the remedial systems. The downgradient monitoring wells were replaced and quarterly ground water monitoring sampling was required as part of the WDNR's February 1, 1998 Plan Modification Approval. Therefore, most of the ground water data analysis focused on the information collected since early 1998. The Kohler Company is required to report their monitoring results to the WDNR every quarter for inclusion into the State's database.

Since activation of the perimeter drain system in late 1997, many contaminant concentrations have decreased dramatically while some have actually increased over time. This indicates that the ground water system's response to the perimeter drain is complex. In spite of this, certain patterns in the results can be discerned which give clues to contaminant behavior. The easiest way to evaluate this data is by breaking up the different contaminant responses by hydrostratigraphic unit.

The uppermost alluvial unit is monitored by two downgradient wells, 22-U and 21-U. Data generated from these two wells since the installation of the perimeter drain system indicates a marked improvement in water quality within the upper alluvial unit. Concentrations of trichloroethylene (TCE) have steadily declined. Concentrations for TCEs degradation product cis-1,2-dichloroethylene (cis-1,2-DCE) have steadily declined as well, especially in well 22-U. Another daughter product of TCE dechlorination, vinyl chloride, was not detected at all in well 22-U. Chloride levels have decreased, including a significant decrease from 2005 to 2006. Specific conductivity readings have dropped significantly in both wells. The improvement in the water quality of the upper unit can be tied to the effectiveness of the perimeter drain system at intercepting and containing leachate discharging from the landfill.

The confined unit located just below the varved lacustrine clays, sometimes referred to as the "lower till unit", is being monitored by two piezometers (21-L and 22-L) nested with alluvial wells. The ground water quality results from these wells reveal an entirely different response to the remedial action. Unlike the shallower wells, TCE has not been detected in either well. However, levels of the TCE daughter products of cis-1,2-DCE and vinyl chloride have increased since the installation of the remedial system. Vinyl chloride levels in well 21-L have slightly increased from the year 2003 to 2006, from 853 ppb to 948 ppb. In well 22-L, the vinyl chloride level went from 31.70 ppb to 51.20 ppb in that same time span. The cis-1,2-DCE increases have been slightly trending upward as well, with the exception of the year 2004 where a larger increase happened in well 21-L (from 534 ppb to 665 ppb) and in well 22-L (from 27.20 ppb to 412 ppb). The next year cis-1,2-DCE concentrations went significantly down. Although it may seem counterintuitive, these dramatic increases in contaminant concentrations are indications that the perimeter drain system is functioning as designed. By lowering the ground water table through pumping, the drain system is drawing in deeper flow pathways that normally would be discharging into the Sheboygan River.

This effect is also mirrored by the monitoring wells screened in the shallow bedrock unit, 14-R and 14-SR. In both these deeper wells, the concentrations of both vinyl chloride and cis-1,2-DCE have increased dramatically, although their progenitor, TCE, has not been detected in either well. The most reasonable interpretation of these results is that there exists a substantial source of dense nonaqueous phase liquid (DNAPL) in the form of TCE deep within the bedrock aquifer. As the TCE undergoes reductive dechlorination, its daughter products are released into the deeper flow regimes. Prior to installation of the perimeter drain system, these contaminants would follow the flow to discharge into the Sheboygan River. The drain system has altered the hydrologic flow regime and is now intercepting an increasing amount of deeper, more contaminated, ground water. This process may actually be speeding up the process of reductive dechlorination within the DNAPL mass, but that hasn't been proven.

The remedial system is operating as designed and is intercepting contaminated ground water from both the shallow and deep aquifers beneath the site. If ground water quality trends continue, the upper, shallow unit may achieve compliance with the cleanup goals within the next 5-10 years. Due to uncertainties regarding the degree and extent of the DNAPL source in the deeper aquifer, it is difficult to determine when the deeper wells might achieve the cleanup standards. The drain system is expected to operate for at least 30 years.

No potentially toxic or mobile transformation products have been identified during sampling events that were not already present at the time of the ROD, and therefore have cleanup goals specified in the ROD. There is also no evidence that the contaminant plume has migrated beyond the Sheboygan River.

Table 4 - Annual Comparison of Groundwater Concentrations

Well Number	Sample Date	Concentration in ppb				
		TCE	cis-1,2 DCE	Vinyl Chloride	Specific Conduct.	Chloride ppm
14-R (267)	3/1998	ND	405	241	1271	71.9
	3/1999	ND	471	338	1251	67.7
	3/2000	ND	476	898	1216	72.8
	3/2001	ND	455	514	1131	68.1
	3/2002	ND	547	844	1052	71.3
	3/2003	ND	458	890	1103	70.4
	3/2004	ND	510	947	1085	77.6
	3/2005	ND	407	736	1188	75.2
	3/2006	ND	480	843	1230	75.1
14-SR (268)	3/1998	ND	538	253	1247	65.6
	3/1999	ND	846	366	1153	61.3
	3/2000	ND	694	951	1130	66.2
	3/2001	ND	777	600	1038	62.2
	3/2002	ND	894	817	963	61.0
	3/2003	ND	694	887	1049	66.0
	3/2004	ND	930	1061	997	73.0
	3/2005	ND	610	667	1153	71.0
	3/2006	ND	839	1307	1159	71.0
21-U (301)	3/1998	NS	NS	NS	NS	NS
	3/1999	ND	8.95	ND	1650	49.4
	3/2000	1.13	7.97	ND	1448	53.3
	3/2001	0.56	7.57	2.57	1378	55.1
	3/2002	0.33	2.36	ND	1147	41.2
	3/2003	0.38	329	248	1046	65.0
	3/2004	0.38	7.14	8.74	1100	33.0
	3/2005	ND	138	16.71	996	61.0

Well Number	Sample Date	Concentration in ppb				
		TCE	cis-1,2 DCE	Vinyl Chloride	Specific Conduct.	Chloride ppm
	3/2006	ND	0.85	ND	833	25.0
21-L (302)	3/1998	NS	NS	NS	NS	NS
	3/1999	ND	471	289	1055	59.4
	3/2000	ND	405	803	990	63.5
	3/2001	ND	623	555	977	63.3
	3/2002	ND	534	824	998	63.2
	3/2003	ND	534	853	999	65.0
	3/2004	ND	665	880	1032	68.0
	3/2005	ND	569	955	1033	70.0
	3/2006	ND	434	948	1036	69.0
22-U (303)	3/1998	NS	NS	NS	NS	NS
	3/1999	2.20	14.3	ND	3750	188.8
	3/2000	1.49	5.97	0.99	3500	191.8
	3/2001	1.59	5.92	ND	2020	87.6
	3/2002	1.68	7.77	0.3	2750	165.4
	3/2003	1.57	8.30	ND	2630	182.0
	3/2004	1.20	5.38	ND	2390	170.0
	3/2005	1.34	3.10	ND	2710	173.0
	3/2006	1.09	2.95	ND	2080	134.0
22-L (304)	3/1998	NS	NS	NS	NS	NS
	3/1999	ND	3.53	ND	661	13.3
	3/2000	ND	13.20	11.9	646	14.9
	3/2001	ND	20.68	5.88	455	13.4
	3/2002	ND	20.10	11.68	463	13.7
	3/2003	ND	27.20	31.70	594	16.6
	3/2004	ND	412	39.30	616	17.5
	3/2005	ND	47.10	55.50	652	17.4
	3/2006	ND	47.50	51.20	571	14.4

ND = Not Detected
NS = Not Sampled

= Value above Clean-up Goal
(NR 140 Enforcement Standard)

Leachate Monitoring

Quarterly analysis of leachate samples taken from the perimeter drain system found that levels of contaminants of concern were steadily decreasing. In an average year, the perimeter drain system will collect approximately 5,500,000 gallons of liquid for discharge to the Sheboygan POTW where it is treated and ultimately discharged.

Table 5 - Annual Comparison of Leachate Concentrations

Year	Concentration in ppb			
	Trichloroethylene	1,2-Dichloroethylene	Vinyl Chloride	Chloride (in ppm)
1998	2.43	21.0	0.49	157.7
1999	1054	16.2	1.71	169.4
2000	1.72	11.5	1.18	134.7
2001	1.19	5.4	ND	165.4
2002	0.70	24.1	ND	187.9
2003	1.00	31.3	ND	198.1
2004	0.61	31.8	ND	205.1
2005	0.90	43.83	ND	199.7
2006	0.41	12.62	ND	187.6

ND = Not Detected
NS = Not Sampled

Site Inspection

A site inspection was conducted on May 23, 2007, by the RPM (See Attachment 5). The purpose of the inspection was to assess the protectiveness of the remedy, including the maintenance and operation of the perimeter ground water interception drain and pumps, the integrity of the cap, and the condition of the surface water diversion systems and monitoring wells.

No significant issues have been identified at any time regarding the cap, the drainage structures, or the perimeter drain system. It was noted that the Kohler Company has capped 46 acres of the landfill bringing the total landfill area with final cover placement to 88 percent. All drainage structures were intact and functioning as designed and the vegetative cover on the capped areas of the landfill was thriving. A portion of the old landfill is being used as a staging area for waste products (pottery cull and foundry sand) until they can be shipped off site for beneficial reuse projects.

The ground water interceptor drain on the southern and eastern perimeter of the landfill was operational and well maintained. The groundwater monitoring wells were in good shape and secure. Security appears to be effective as there was no evidence of unauthorized access to the site. There was no new development directly adjacent to the site and no new uses of groundwater were observed.

Public Input

On July 25, 2007, an advertisement was run in the Sheboygan Press newspaper explaining that the five-year review process had started and briefly explained the five-year review process. The newspaper ad also identified the major components of the remedy. A completion date of September 2007 was listed as well as identifying Thomas A. Wentland of the WDNR as the contact person for additional information. No comments concerning the Kohler Company Landfill or the five-year review process were received during this period.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Yes. The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD, as modified by the ESD. The capping of contaminated wastes within the landfill has achieved the remedial objectives to minimize the migration of contaminants to groundwater and surface water and prevent direct contact with, or ingestion of, contaminants in waste materials. Current permit requirements have prevented exposure to, or ingestion of, contaminated groundwater.

Operation and maintenance of the cap and drainage structures has, on the whole, been effective. With the exception of extraordinary events, the O&M annual costs are actually somewhat less than the original estimates. There have been some minor difficulties with implementation of the remedy, but the Kohler Company has promptly taken steps to correct the problem and maximize the efficiency of the remedial system.

There were no opportunities for system optimization observed during this review. The monitoring well network provides sufficient data to assess the progress of natural attenuation within the plume and the effectiveness of the perimeter drain system. Maintenance on the cap is sufficient to maintain its integrity and new sections of cap are constructed as filling achieves final grades.

No activities were observed that would have violated the objectives of the institutional controls. The cap and the surrounding area were in good repair, there were no signs of unauthorized access, and no new uses of groundwater were observed. The gate to the site is intact and in good repair. Long-term protectiveness requires compliance with effective ICs to ensure that the remedy continues to function as intended. Compliance with effective ICs will be ensured by implementing, maintaining and monitoring effective ICs as well as maintaining the site remedy components. To that end, an IC study and IC plan will be developed.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considered

ARARs that still must be met at this time and that have been evaluated include: ch. NR 140, Wisconsin Administrative Code (Enforcement Standards and Preventative Action Levels); the Safe Drinking Water Act (SDWA) (40 CFR 141.11-141.16) from which many of the groundwater cleanup levels were derived [Maximum Contaminant Levels (MCLs), and MCL Goals (MCLGs)]; and ARARs related to monitoring, landfill capping, and operation of the perimeter drain system as contained in the WDNR Plan Modification Approvals. There have been no changes in these ARARs. No new standards or TBCs affecting the protectiveness of the remedy have been identified.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (older child trespasser, adult trespasser) and potential future exposures (young and older future child resident, future adult resident and future adult worker). There have been no changes in the toxicity

factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is progressing as expected and it is expected that all groundwater cleanup levels will be met within approximately 30 years.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. There is no information generated during the five-year review process or other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD, as modified by the ESD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There has been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Complete IC study* A complete analysis of the institutional controls should be performed at the Site to assure that the remedy is functioning as intended with regard to the ICs	N	Y
Complete IC Plan Long-term stewardship needs to be assured for the Site. This will be provided through preparation of an IC plan and appropriate follow-up	N	Y

IX. Recommendations and Follow-Up Actions

This five-year review has summarized the remedial activities and current O&M activities at the Kohler Company Landfill Site. Long-term stewardship must be assured which includes implementing, maintaining and monitoring effective ICs. The following actions should be considered for continued O&M and optimization of the implemented remedy:

Recommendations/ Follow-up Actions	Responsible Party	Oversight	Milestone	Affects Protectiveness (Y/N) Current/ Future
Complete IC study* Analysis of the institutional controls in place at the site is needed to assure effective ICs are in place so that the remedy continues to function as intended with regard to the ICs and to ensure effective procedures are in-place for long-term stewardship at the Site.	PRPs	U.S. EPA and WDNR	March 2008	Current – No Future - Yes
Complete IC Plan An Institutional Control Plan will be prepared documenting necessary IC evaluation activities and necessary corrective measures. The IC plan is necessary to evaluate effectiveness of any existing ICs, to implement additional ICs and plan for long-term stewardship to ensure long-term protectiveness of the remedy.	U.S. EPA and WDNR	U.S. EPA and WDNR	March 2008	Current – No Future - Yes

*To: 1) Determine whether deed restrictions are in place; 2) If so, evaluate the existing ICs to determine effectiveness and enforceability; 3) Update site ICs, if needed, to ensure that the ICs are properly recorded to give notice to future landowners for information relevant to land use restrictions and are enforceable; 4) Prepare accurate maps of all areas that require land and groundwater restrictions 5) Perform title work to ensure ownership and whether an prior in time encumbrances could impact the ICs; and 6) Provide revision to the O&M plan to include mechanisms to ensure regular inspections of ICs at the site, an annual certification to U.S. EPA that ICs are in place and effective, and a communication plan to ensure long-term stewardship.

X. Protectiveness Statement

All immediate threats for the source control operable unit at the site have been addressed and the remedy is expected to remain protective of human health and the environment. The landfill is being operated in accordance with the requirements of Wisconsin Administrative Code NR 500 to 520. All immediate threats for the groundwater operable unit have been addressed at the site and the groundwater portion of the remedy is expected to be fully protective of human health and the environment after the groundwater cleanup goals are achieved through pumping and monitored natural attenuation in an estimated 30 years. Institutional controls for source control and groundwater are required to ensure that there is no inappropriate use of the Site or groundwater. The remedy is currently functioning as intended because no inappropriate Site or groundwater uses are occurring. Because the remedial actions at both of the operable units are protective, the site is protective of human health and the environment.

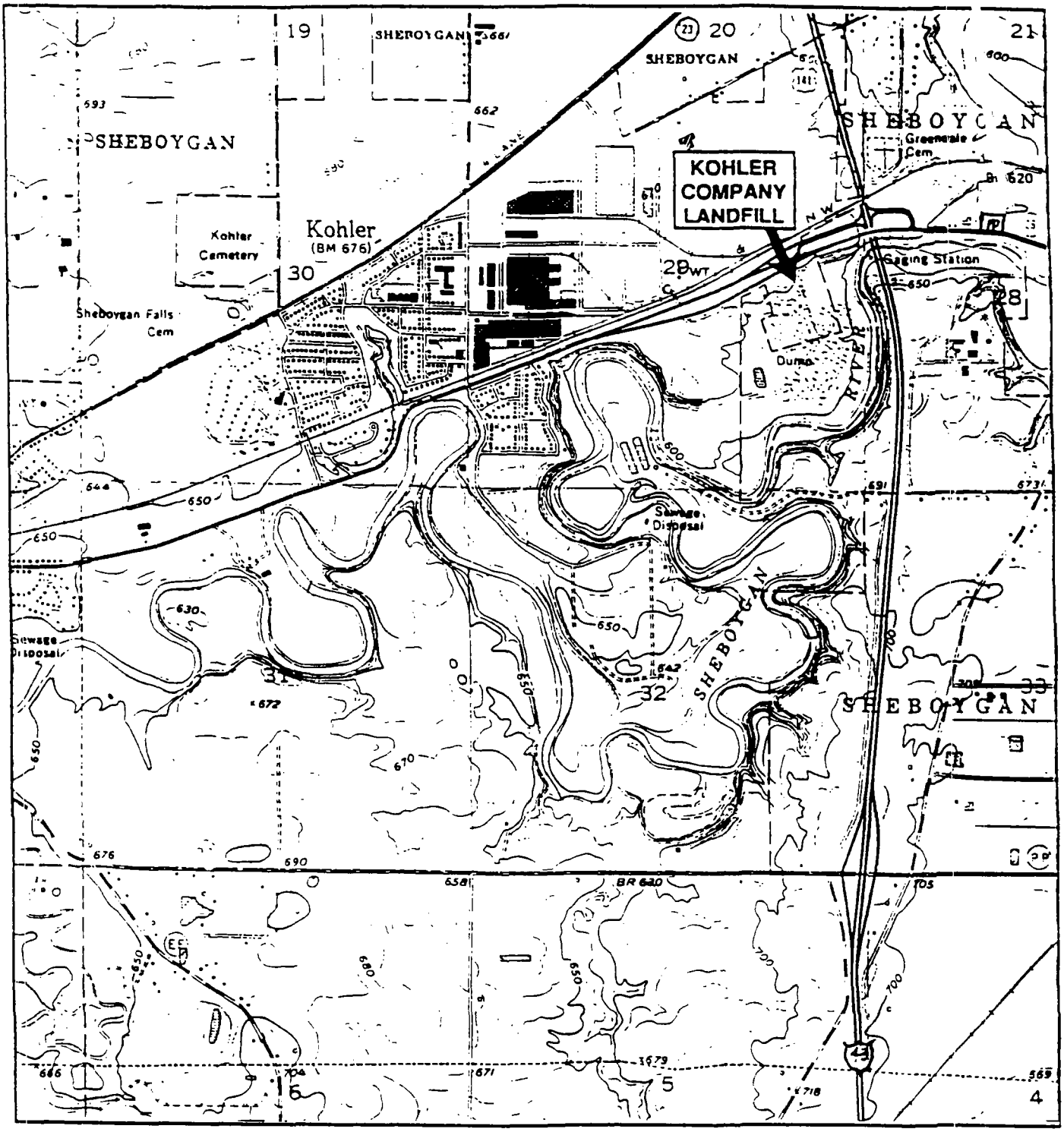
Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate the effectiveness of the perimeter drain system in preventing contaminated liquids migration from the waste mass towards the river. Current data indicates that significant amounts of contaminants are being intercepted by the drain system. Additional sampling and analysis will be conducted on a regular basis as required. Marked improvements in the water quality of the upper aquifer indicate that the remedy is functioning as designed.

Long-term protectiveness also requires compliance with effective ICs. Compliance with effective ICs will be ensured through long-term stewardship by implementing, maintaining and monitoring effective ICs as well as maintaining the site remedy components. To ensure the remedy continues to function as designed, an institutional controls study and plan will be prepared.

XI. Next Review

The next five-year review for the Kohler Company Landfill Site is required within five years of the signature date of this review.

ATTACHMENT 1 - **Site Location Map**



SOURCE: USGS 7.5 Minute Topographic Map, SHEBOYGAN FALLS, WISCONSIN Quadrangle, 1973

N

0 1000 2000 4000

SCALE IN FEET

GERAGHTY & MILLER, INC.
Environmental Services

FIGURE 1
SITE LOCATION MAP
KOHLER COMPANY LANDFILL
KOHLER, WISCONSIN

ATTACHMENT 2 - **Site Plan**

Institutional Control (IC) Review
Site Base Map

Superfund
U.S. Environmental Protection Agency

Kohler Co. Landfill
Sheboygan County, WI

WID006073225

Legend

Kohler Co Landfill Boundary

0 400 800 Feet

N

GEOS
Groundwater Evaluation and Optimization System

RPM: Pablo Valentin

Created by Sarah Backhouse
U.S. EPA Region 5 on 9/26/06

Kohler Company Landfill Site
Kohler, Wisconsin

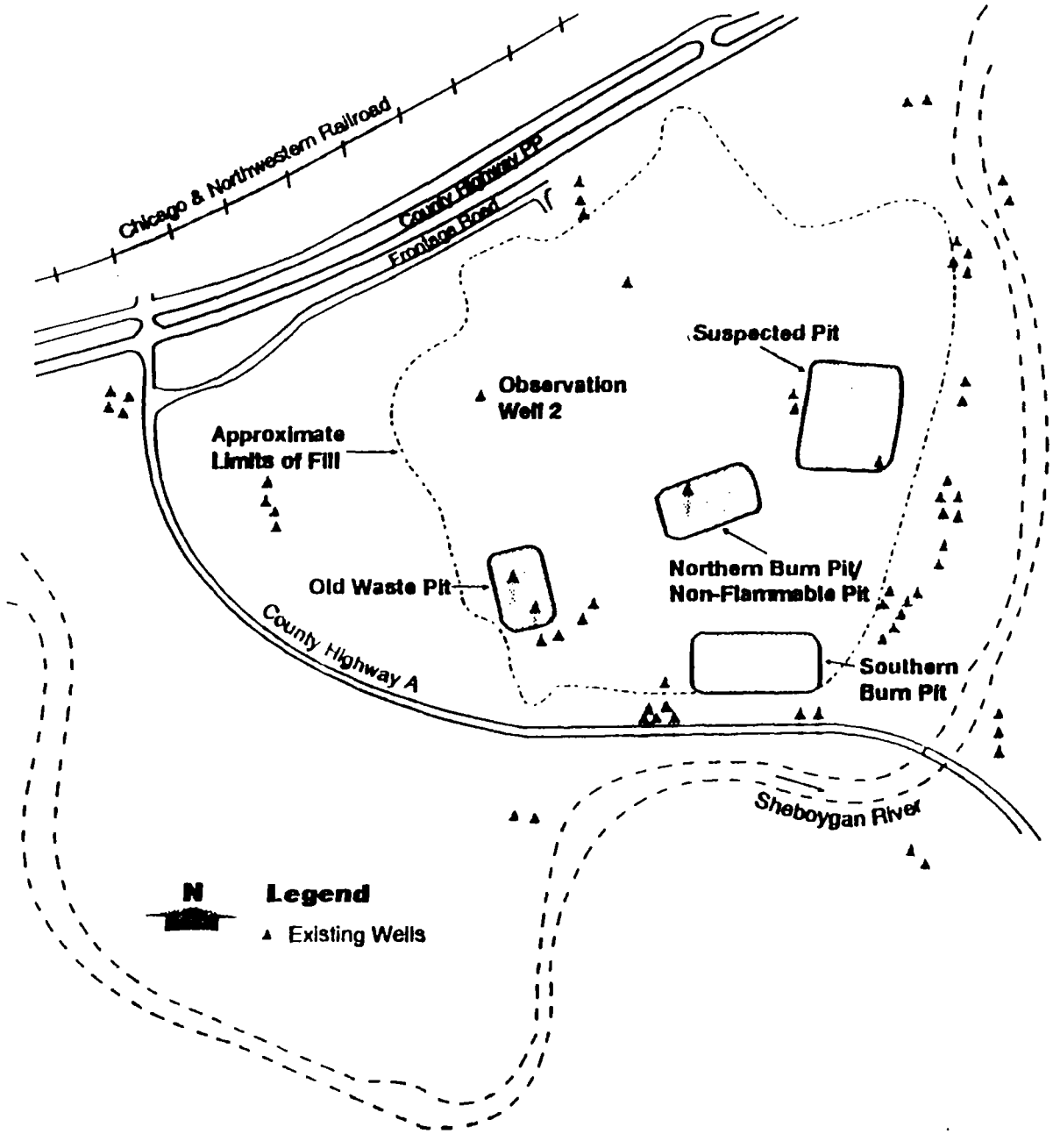


Figure 2

ATTACHMENT 3 - **2006 Annual Report & Groundwater Contaminant Trends**

KOHLER CO.
TWIN OAKS LANDFILL

LICENSE NO. 01508

2006 ANNUAL REPORT

February 23, 2007

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report is being submitted to satisfy the reporting requirements specified in the August 29, 1995 Plan Modification Approval Letter prepared by WDNR. The Approval Letter requires that an annual report be prepared which documents the performance and maintenance of the final cover and drainage systems as specified in the Source Control and Groundwater Record of Decisions (ROD) issued on March 30, 1992 and June 26, 1996 respectively.

2.0 ANNUAL REPORTING REQUIREMENT / STATUS

Condition 20 of the August 29, 1995 WDNR Conditional Plan Modification Approval is addressed in the following narrative by presenting each specific condition with a corresponding response for the status at the conclusion of calendar year 2006.

20. An annual report shall be submitted to the Department after the 1996 construction season. The annual report shall document the performance and maintenance of the final cover and drainage systems. The annual report shall be submitted no later than March 1 of each year. The frequency of submittal of the report may be altered after the fifth year following final closure of the landfill. The report shall include the following:

a. Any evidence of erosion, differential settlement or impeded drainage, exposed capping layer, rooting zone, or subsurface drain materials, soil slumping or downslope movement, integrity of surface swales and other drainage features, any evidence of water ponding or formation of depressions, and cover condition in the surface water drainageways.

Within the boundaries of the completed Phase I, Sections A through D, Phase II, Section A through E and Phase III, Section A, final cover system, there is no evidence of erosion, differential settlement or impeded drainage, exposed capping layer, rooting zone, or subsurface drain materials, soil slumping or downslope movement. Surface swales and other drainage features show no signs of degradation. There is no evidence of water ponding or formation of depressions. The cover conditions in the surface water drainageways are robust and show no signs of degradation.

b. An evaluation of the condition of the final cover vegetation, vegetative cover vigor and diversity, and animal intrusion.

The final cover vegetation is abundant and robust within the boundaries of the completed Phase I and Phase II final cover system. Final cover was placed on Phase III, Section A in November 2006; seeding will be completed in spring 2007.

There is no evidence of degradation caused by animal intrusion in any of the landfilled area that has received final cover.

c. **A description of groundwater flow and quality trends, based upon the groundwater monitoring data generated over the past year, with a comparison to data from previous years and a plan sheet with water table contours drawn from the sampling period of the past year with the highest water table elevations.**

The landfill groundwater monitoring wells are sampled quarterly or semiannually depending on the permit requirements for a suite of organic and inorganic parameters as defined in Wisconsin Administrative Code, NR 140. For some wells, sampling did not commence until 1998. Indicator parameters detected above WDNR preventive action limits (PALs) from the first quarter 1996 through December 2006 are depicted graphically in Figure 1 for chloride and Figure 2 for sulfate. Volatile organic compounds detected above PALs are shown in Figure 3 for vinyl chloride, Figure 4 for chloroform, Figure 5 for cis 1,2-dichloroethene, Figure 6 for trichlorehthene and Figure 7 for methylene chloride. Parameters that have not exceeded its corresponding PAL for a period of sixty months are not shown.

The information presented in Figures 1 through 7 includes data from the existing monitoring well network; information from previously abandoned wells is not included therein. Each of the graphical presentations, depict the analytical value obtained from each sampling event during the period noted and the corresponding PAL for ease of comparison. In instances where a parameter was not detected above the detection limit (as denoted on the analytical report by a "less than" designation), the detection limit is used as the detected value for graphical purposes.

Analytical results suggest that groundwater quality has remained generally consistent with respect to indicator parameters and organic constituents. A linear regression trend line, using the least squares method to plot a straight line through analytical values so as to minimize the distance between the data points and the resulting trend line, is included on each figure. The trend line is calculated using the following equation:

$$y = mx + b$$

where,

$$m = n\Sigma(xy) - (\Sigma x)(\Sigma y) / n\Sigma x^2 - (\Sigma x)^2$$

$$b = \Sigma y - m\Sigma x / n$$

x = the current time period

n = the total number of time periods

Groundwater elevation readings were collected in March, June, September and December. Historical groundwater elevation data for each hydrogeologic unit is presented in Figures 8 through 11. To illustrate groundwater flow in each hydrogeologic unit at the site potentiometric surface maps were prepared. The March data reflects the sampling period during 2006 with the highest water table elevations (in the alluvium and upper till). The water table data presented in Figures 12 through 15 indicate that groundwater continues to flow from the landfill in an easterly direction. No significant change in groundwater flow trends has occurred.

The groundwater interceptor trench and force main conveyance system which comprise the Groundwater Control Remedial Action at the Kohler Co. Twin Oaks landfill were operational in 2006. A total of 3,365,230 gallons were pumped from the system to the Sheboygan POTW in 2006 which included 1,241 gallons, 1,301,681 gallons, 35,035 gallons and 2,027,273 gallons from Sumps 1 through 4 respectively (totals acquired from the *Electronic Mag Meters*). A total of 2,553,523 gallons, 4,670,080 gallons and 2,188,072 gallons were pumped from the system to the Sheboygan POTW in 2005, 2004 and 2003 respectively.

Table 1 and Figure 16 provide the flows in tabular and graphical form from the system during calendar year 2006. Figure 17 provides a graphical comparison of the 2004 through 2006 flows from the system; Figure 18 provides a graphical comparison of annual flows in each of the four sumps during this period. Table 2 provides a summary of the analytical results for the leachate pumped from the groundwater interceptor drain to the Sheboygan POTW. Appendix A includes the quarterly laboratory analyses of the discharge which were reported to the Sheboygan POTW as required under Kohler Co.'s WPDES Permit.

System downtime was below average during 2006; flow data was not available for ten days in 2006. Flow data was available for every day in 2005 and flow data was not available during two days, twenty-five and eighteen days in 2004, 2003 and 2002, respectively. Down time has ranged from a high of 145 days in 1999 to zero days in 2005.

Cumulative flow data is available from the *Badger Mechanical Turbine* totaling flow meter (through which sumps 1 through 4 discharge) that was installed in 2000. The totalized flow recorded on the *Badger Mechanical Turbine* meter in 2006 is 4,180,880 gallons. A comparison of the data acquired from the four *Electronic Mag Meters* (one in each sump) and the *Badger Mechanical Turbine* totaling flow meter is provided in Figure 19. Figure 20 includes an historical

overview of flows from the groundwater interceptor trench and force main conveyance system.

NOTE: From January 2006 through December 2006, the totaling flow meter was 24.2% higher than the cumulative total from each sump flow meter. This variance has ranged from a low of 5.8% in 2001 (partial year) to a high of 33.5% in 2003. This high variance between flow meters is typical and inherent to this type of application.

d. A description of all reparative actions taken for erosion, vegetative cover, protective structures, monitoring devices, and stormwater control structures.

Reparative actions to address erosion and vegetative cover were not required in 2006. Reparative actions to address protective structures and stormwater control structures were not required in 2006. Repairs to the Groundwater Interceptor Drain System were not required in 2006. No other reparative actions were necessary.

e. For the reports generated prior to site closure, a summary of site filling rates, remaining capacity, and schedule of anticipated final closure.

Summary of Site Filling Rates

Each shipment that is transported to the Kohler Co. Twin Oaks landfill for disposal is weighed. Total waste tonnage is tabulated on a daily, monthly, quarterly and annual basis; the quarterly and annual data is reported to the Wisconsin Department of Natural Resources on Form 4400-123A (R 3/00) and Form 4400-123 1-02 N505, respectively. A conversion factor of 1.35 tons per cubic yard is used to calculate the daily, monthly, quarterly and annual fill volumes. The conversion factor was developed based on multiple "in-place" density tests of waste material conducted at the site.

26,969 tons (19,977 cubic yards) of solid waste was placed in the Kohler Co. Twin Oaks landfill in 2006. This total includes 14,054 tons of foundry manufacturing waste and 12,915 tons from other manufacturing operations. The 2006 filling tonnage is slightly more than the 26,903 tons (19,928 cubic yards) placed at the site in 2005. Kohler Co. manufacturing operations, located in Kohler, Wisconsin, generated all of the waste received at the site in 2006.

As per condition 4.a. of the August 29, 1995 WDNR Plan Modification Approval, filling operations were confined to the waste-filled area and west of grid line E 2,591,500 and south of grid line N 641,500.

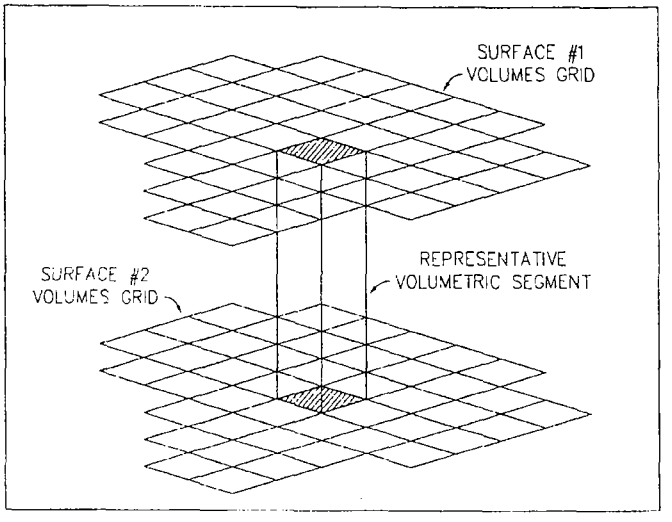
Summary of Remaining Capacity

As of January 1, 2006 approximately 226,000 cubic yards of airspace remained at the Kohler Co. Twin Oaks landfill (the 1997 Annual Report includes a detailed explanation and the original calculation used to generate the "baseline airspace", which has been used as the basis of all subsequent calculations). As such, approximately 206,000 cubic yards of airspace remained at the site as of January 1, 2007 (225,648 – 19,977 = 205,671).

In an effort to verify the remaining site capacity, the final approved grades were compared to existing grades at the site and the remaining airspace was calculated using three computer modeling methods. Appendix B includes a drawing that illustrates the remaining fill area and the test grid used in the model. The three computer modeling methods used to calculate the remaining airspace at the site are discussed below.

GRID METHOD - The grid method calculates volumes using a grid overlaid on two surfaces. This method calculates the volumes by using the prismoidal volume of all grids and summarizing.

Grid Method:

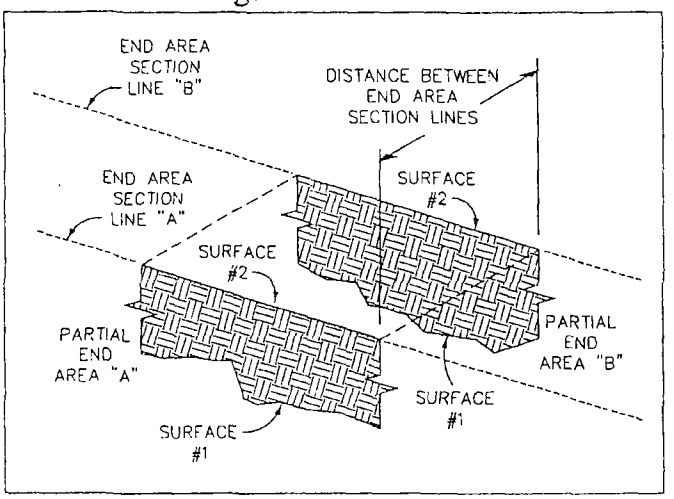


COMPOSITE METHOD – The composite method retriangulates a new surface based on points from both surfaces. It uses the points from both surfaces, as well as any location where the triangle edges between the two surfaces cross. It then calculates the new composite surface elevations based on the difference between the elevations of the two surfaces.

AVERAGE END AREA – This is a Section Method that calculates cross sections from the two surfaces and generates volumes using either Prismoidal or Average End Area. Section lines are defined in the direction being sampled. As each

section is sampled the offset and elevation for each triangle edge is calculated. Average End area is then calculated as shown.

Average End Area method:



An average of the total remaining volume generated by each of the three computer modeling methods was calculated. The multi-layer final cover volume was subtracted from the calculated average resulting in 209,038 cubic yards of remaining "air-space" at the Twin Oaks landfill. This number compares favorably (within two percent) to the 205,671 cubic yards calculated using daily fill tonnage as discussed previously.

Schedule of Anticipated Closure Activities

Based on future projections of waste generation volumes, final grades will be achieved in March 2015 (based on an annual waste generation rate of 25,000 cubic yards per year). Phase III closure activities will be more accurately defined as this date approaches and no later than two years prior to final waste acceptance at the site.

f. Updated plan sheets of surface topography and features, including drainage patterns and remedial actions taken to correct settlement effects, and descriptions of any changes in final use of the landfill area, including areas not used for waste filling.

An updated plan sheet showing surface topography. the Kohler Co. Twin Oaks landfill groundwater monitoring well network and the limits of Phase I, Phase II and Phase III capping activities is included in Appendix C.

No remedial actions were taken to correct settlement effects and as such, are not depicted on the plan sheet.

Currently, there are no existing final use plans for the Kohler Co. Twin Oaks landfill.

Two significant features are depicted on the plan sheet. First, Kohler Co. has implemented a significant beneficial reuse program at its Kohler, Wisconsin manufacturing location that includes storage of spent system sand, fired pottery cull, foundry slag and resin bonded molds at the Twin Oaks landfill. The storage areas are noted on the plan sheet (Appendix C). Each of the stockpiled materials will be beneficially reused in accordance with Wisconsin Administrative Code NR 538. Secondly, Kohler Co. continues to acquire earthen materials that will be used to construct the multi-layer cover system over the remaining fill area at the site. The stockpile locations are depicted on the plan sheet included in Appendix C.

In 2006, Kohler Co. beneficially reused 26,929 tons of manufacturing byproducts. Beneficial reuse projects consumed 11,326 tons, 20,157 tons, 56,172 tons and 30,768 tons in 2005, 2004, 2003 and 2002 respectively.

g. Photo documentation of overviews as well as construction details and vegetation assemblages.

Photo documentation from December 2006 is included as Figure 21.

Figures

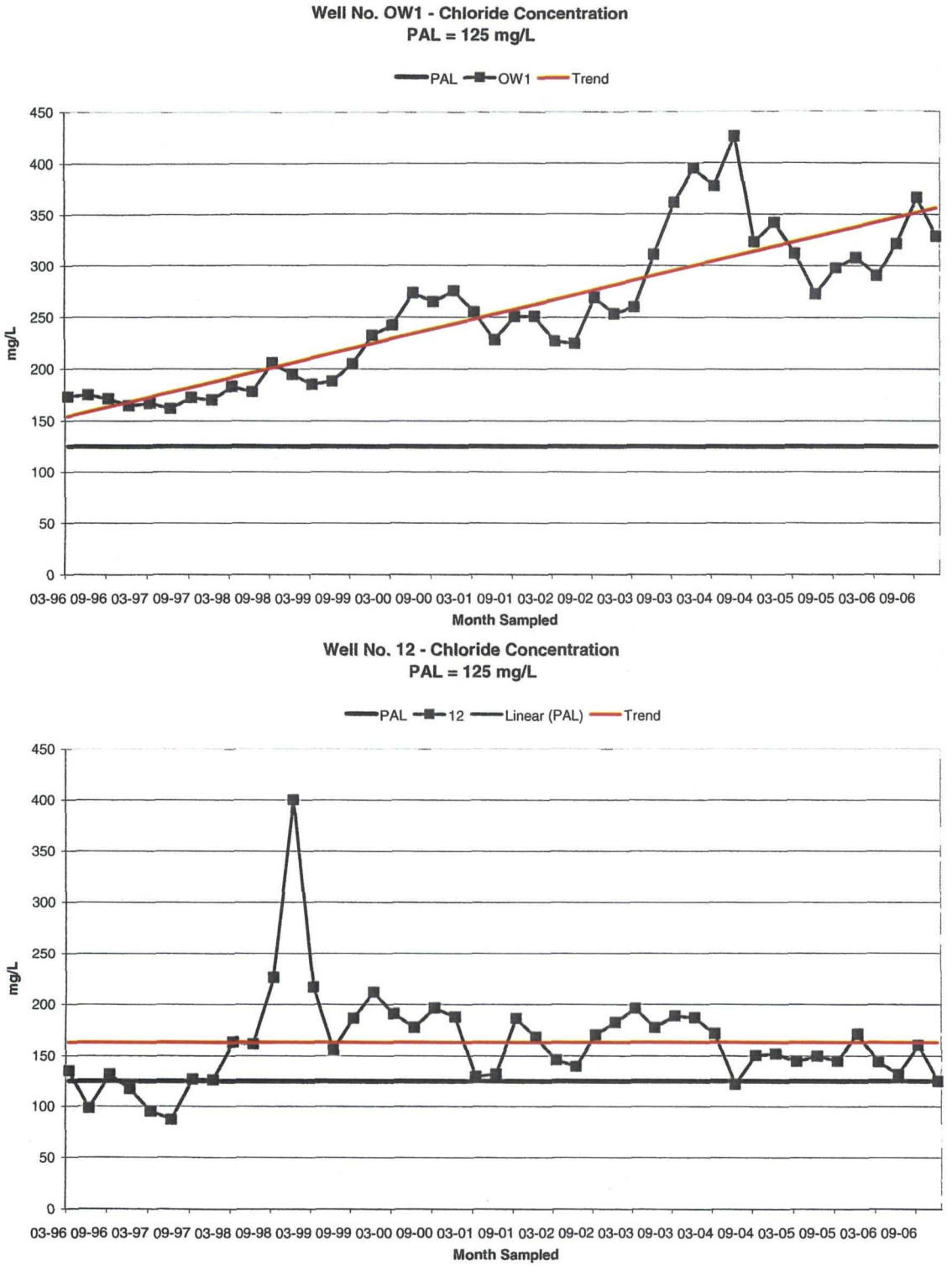
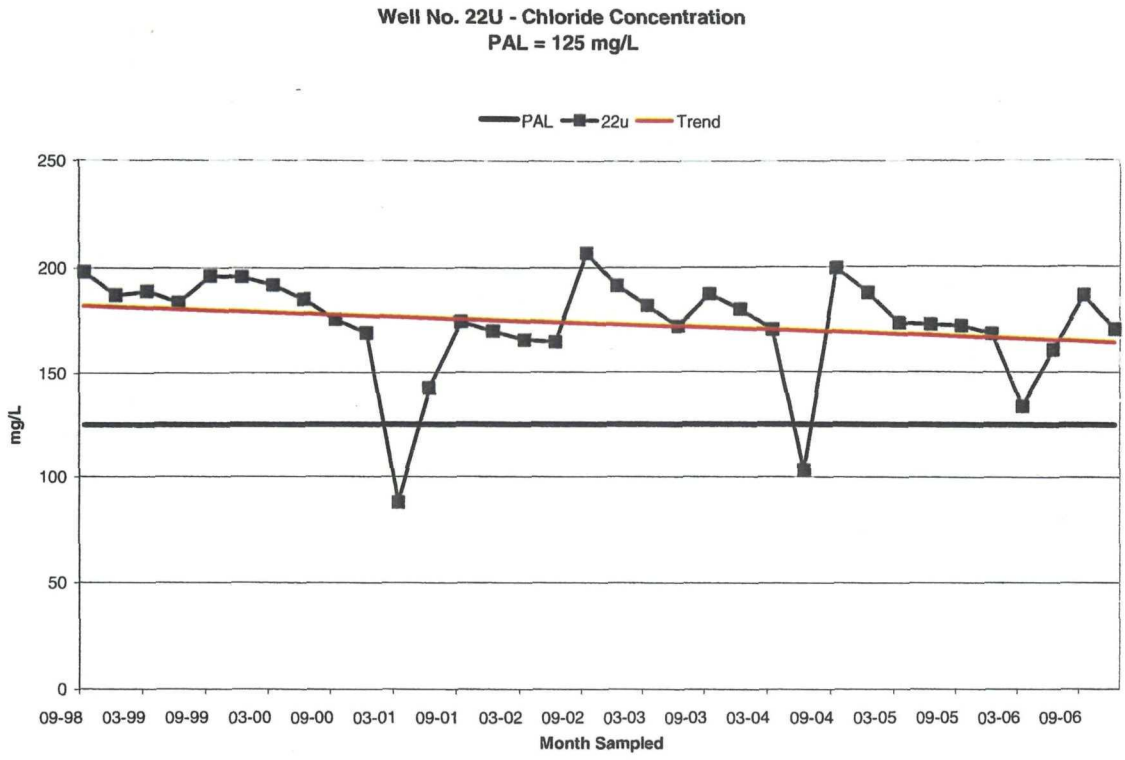


Figure 1
Chloride Concentrations Above Preventive Action Limits (PALS)



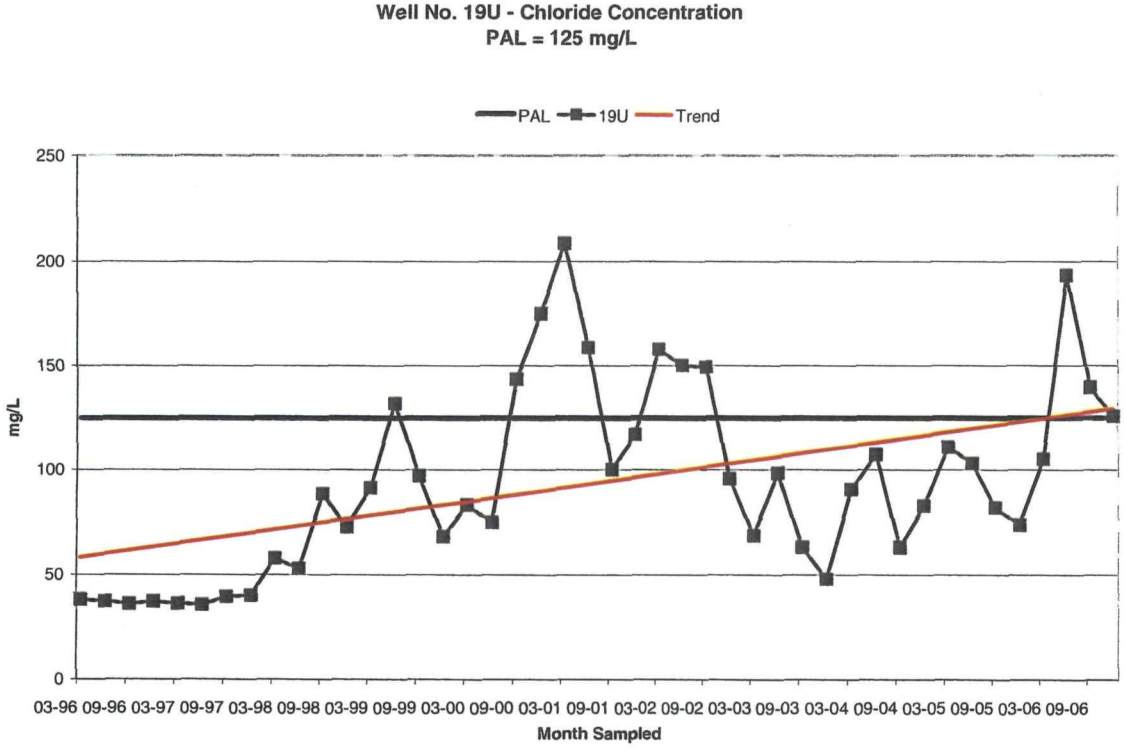


Figure 1 (cont.)
Chloride Concentrations Above Preventive Action Limits (PALS)

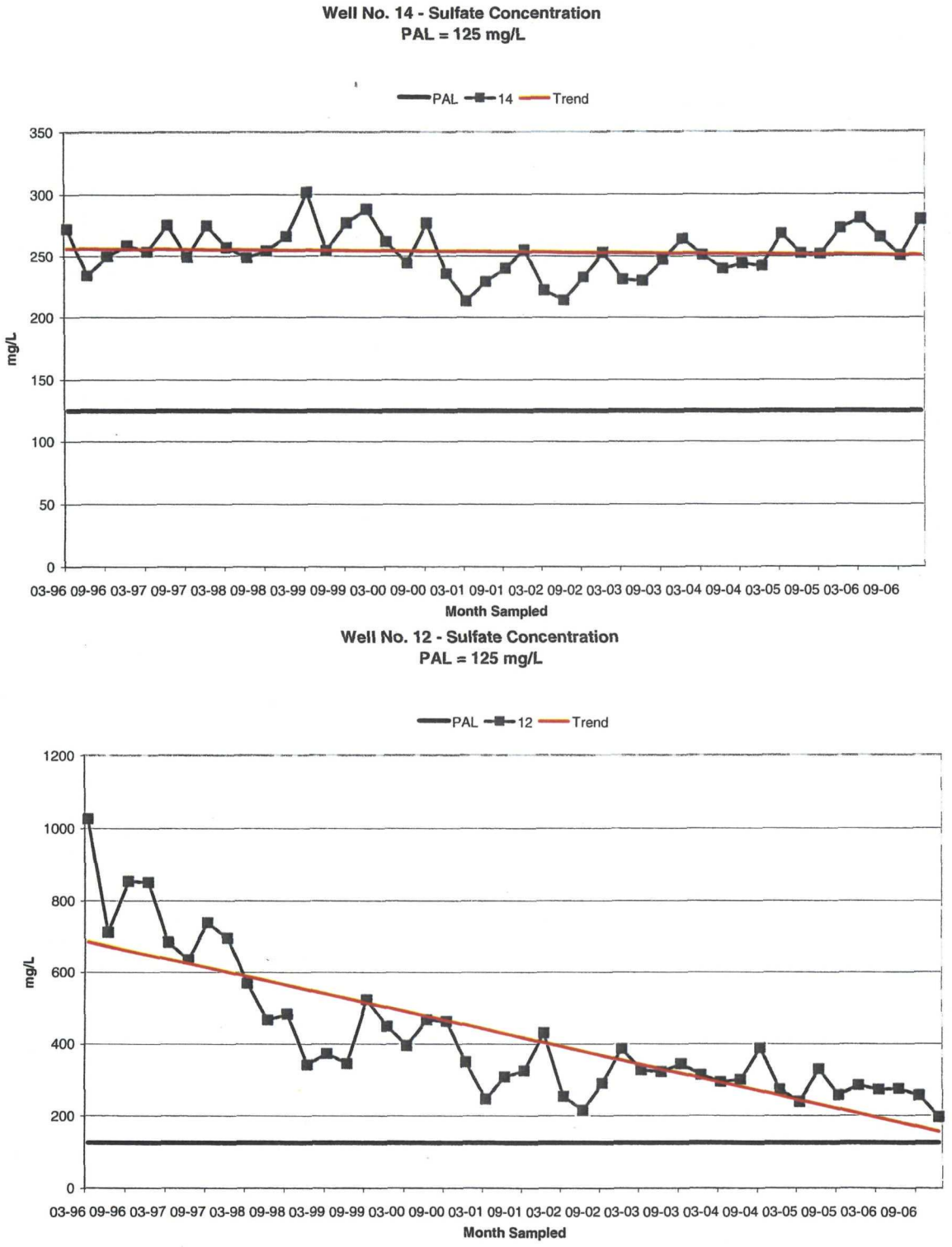
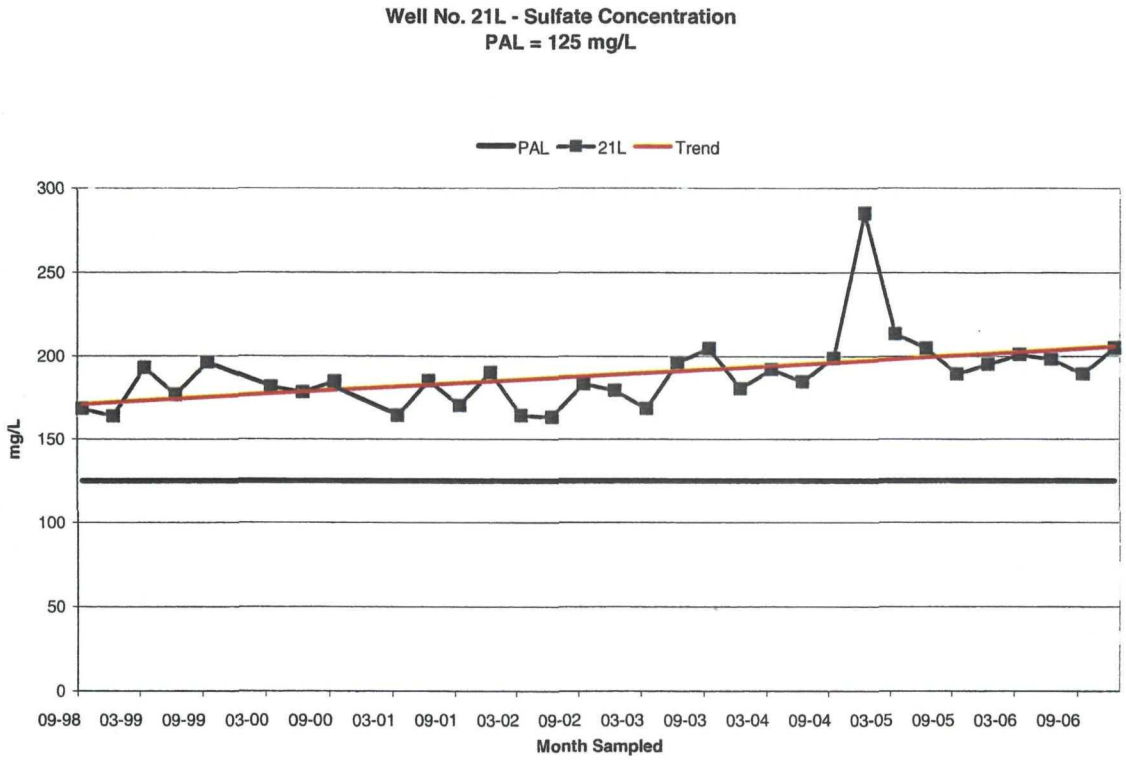


Figure 2
Sulfate Concentrations Above Preventive Action Limits (PALS)



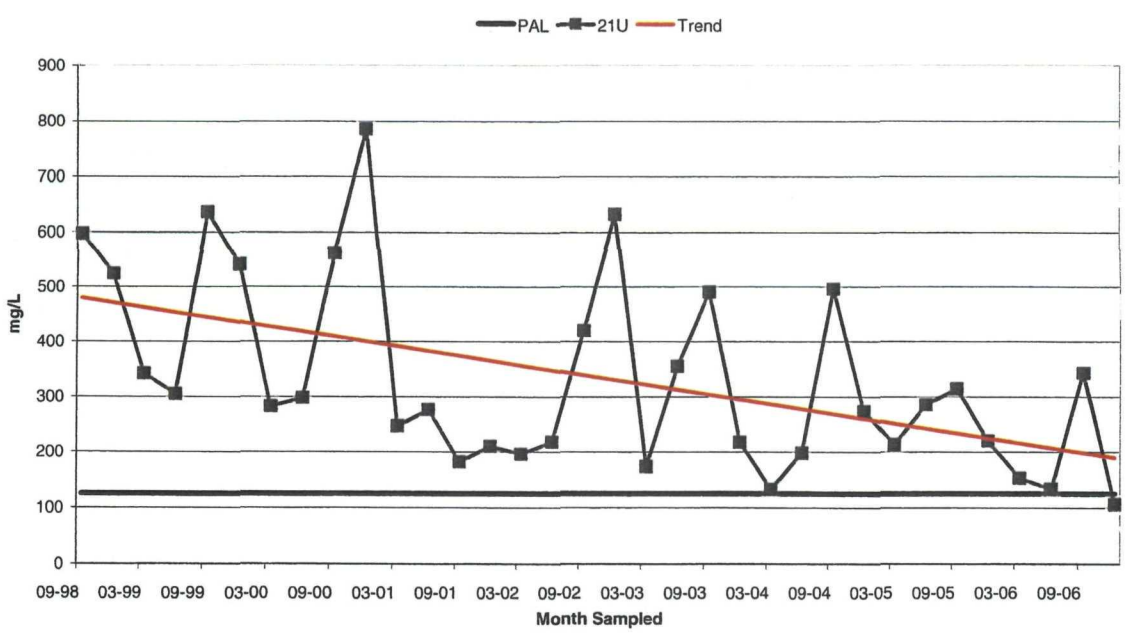
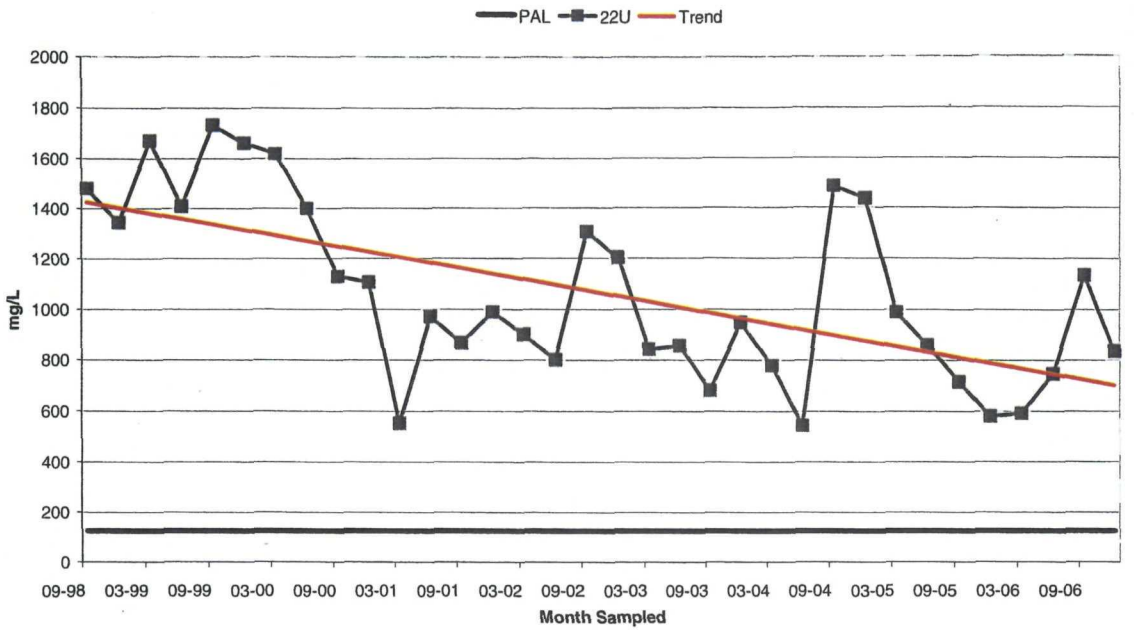


Figure 2 (cont.)
Sulfate Concentrations Above Preventive Action Limits (PALS)



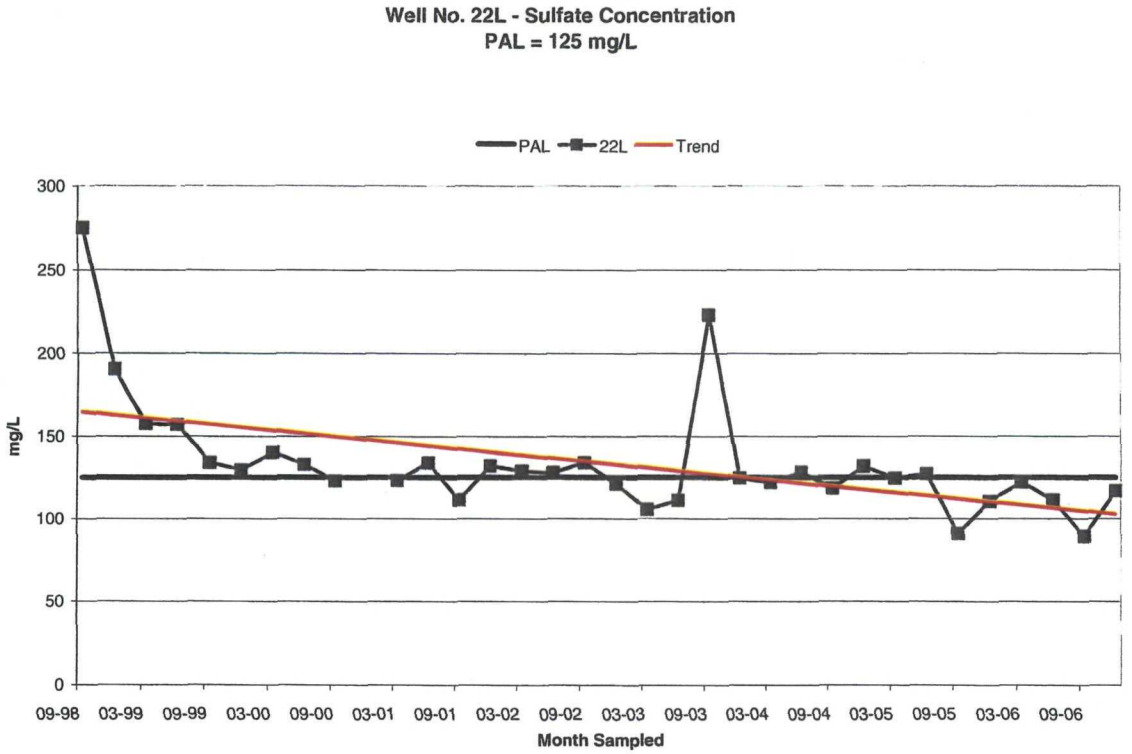
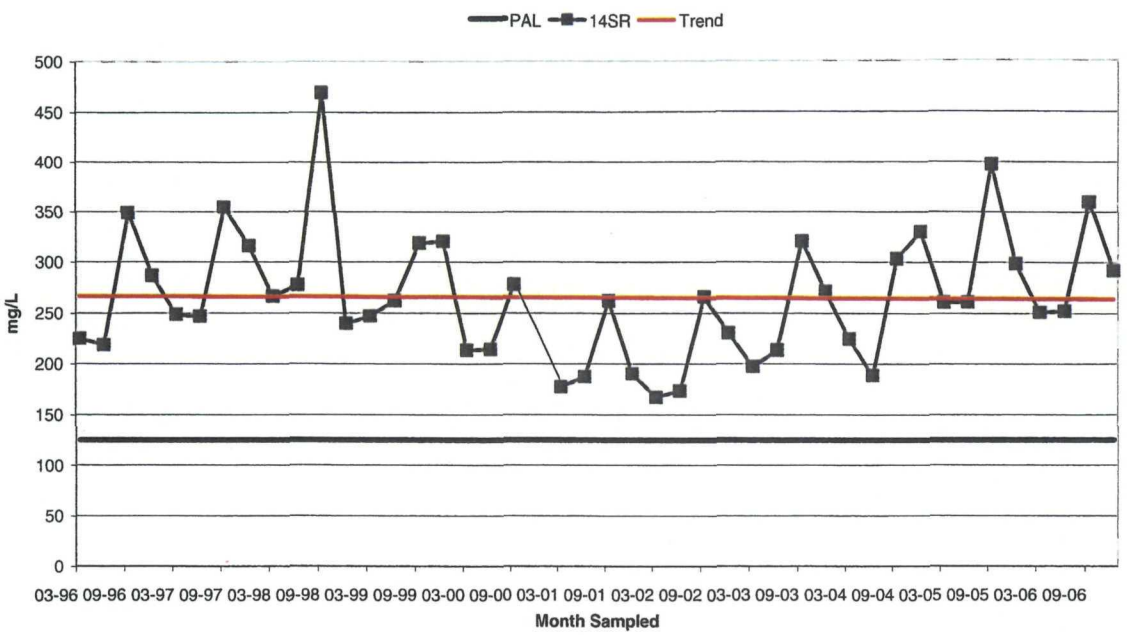


Figure 2 (cont.)
Sulfate Concentrations Above Preventive Action Limits (PALS)



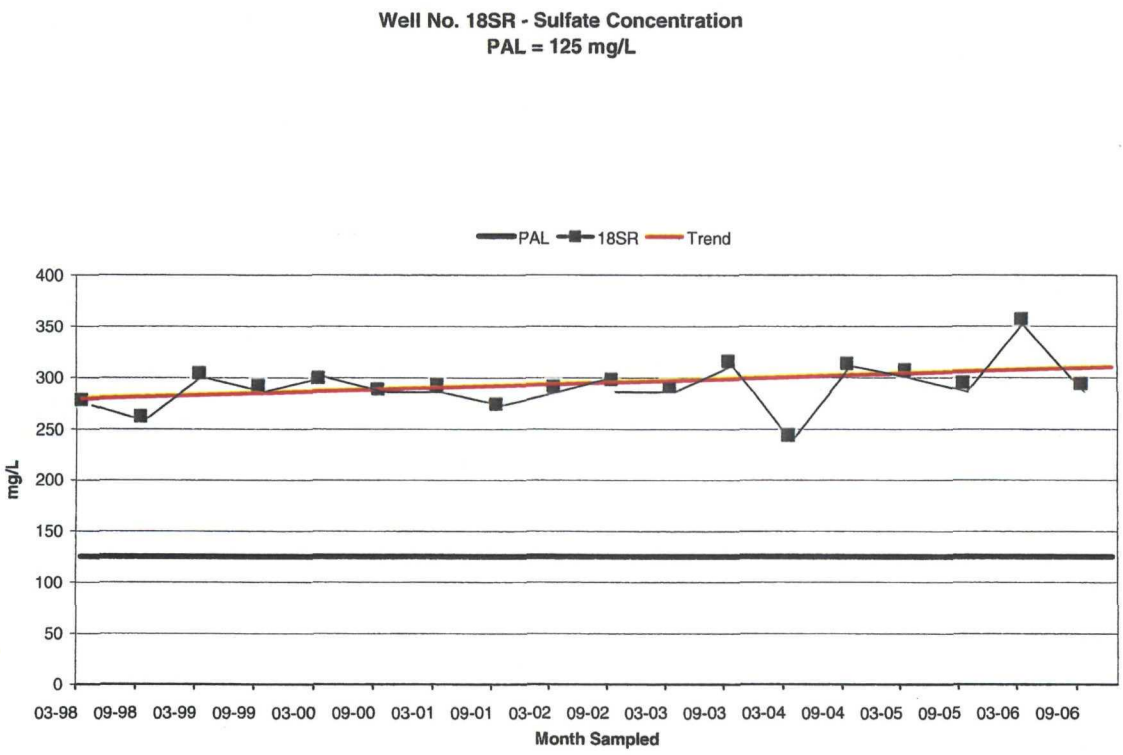
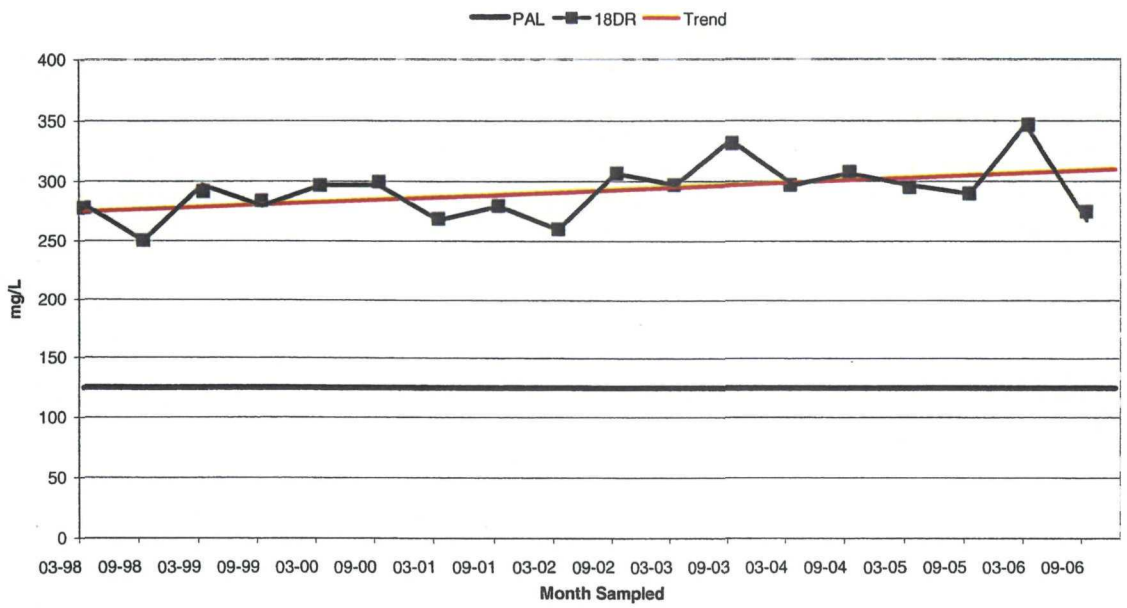


Figure 2 (cont.)
Sulfate Concentrations Above Preventive Action Limits (PALS)



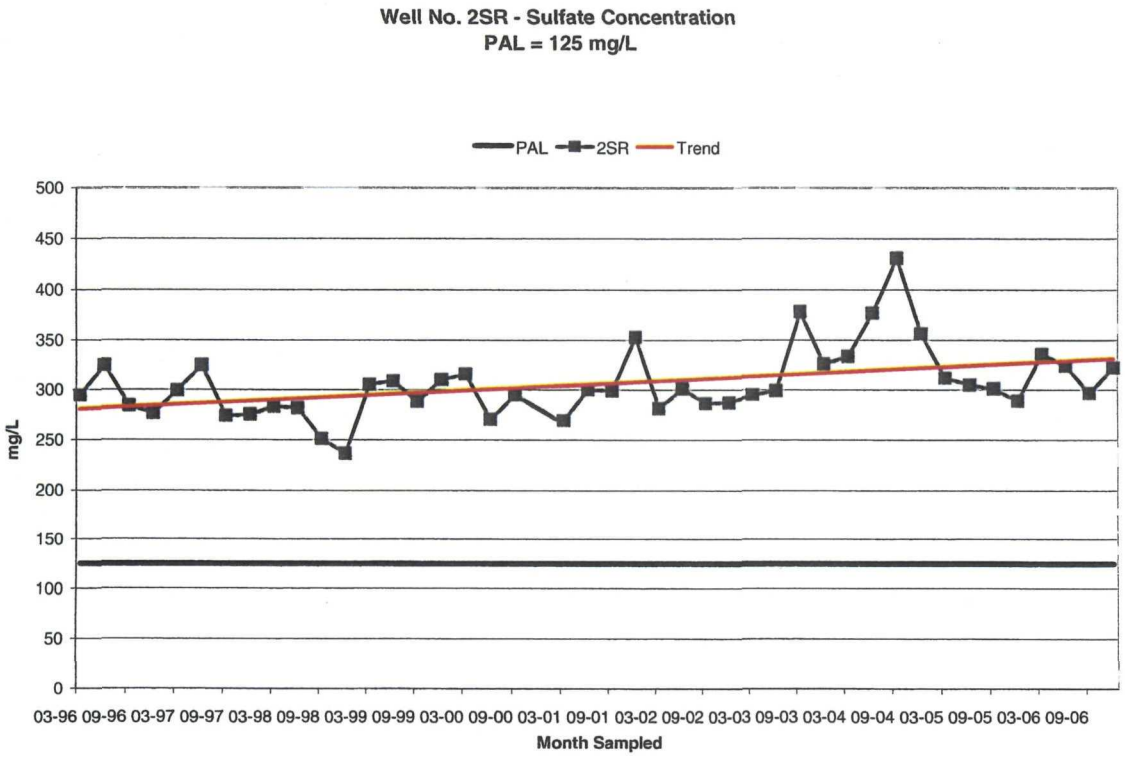
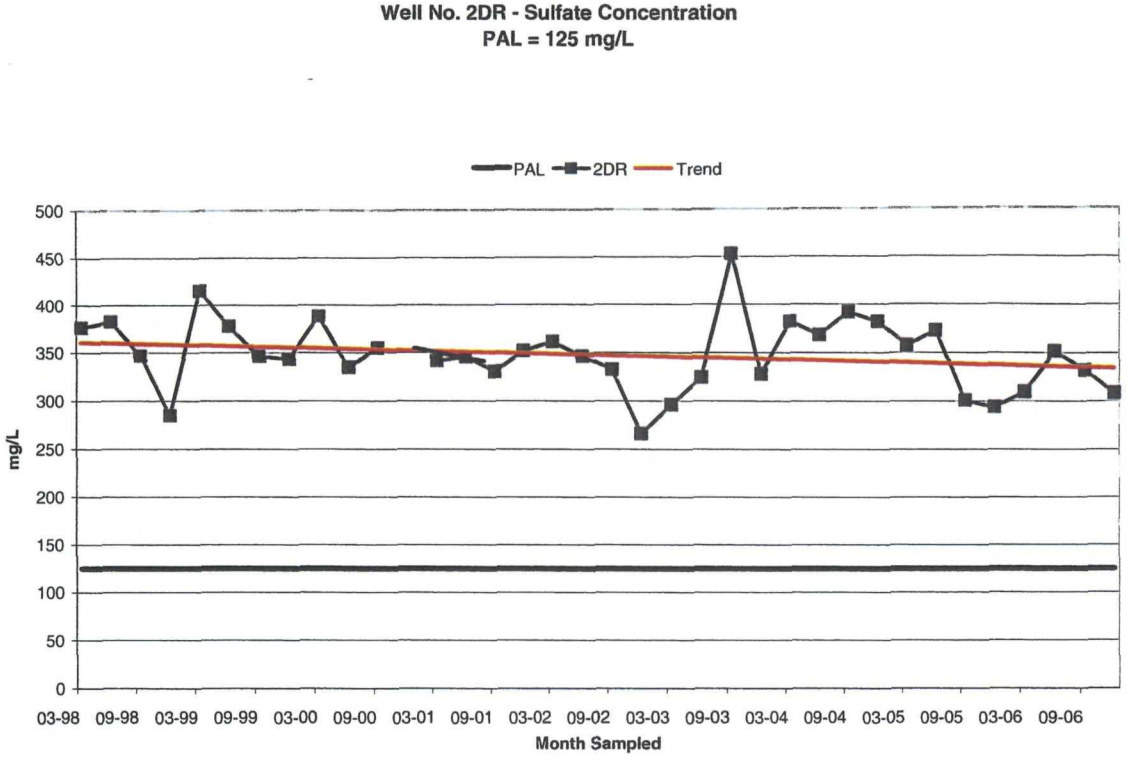


Figure 2 (cont.)
Sulfate Concentrations Above Preventive Action Limits (PALS)



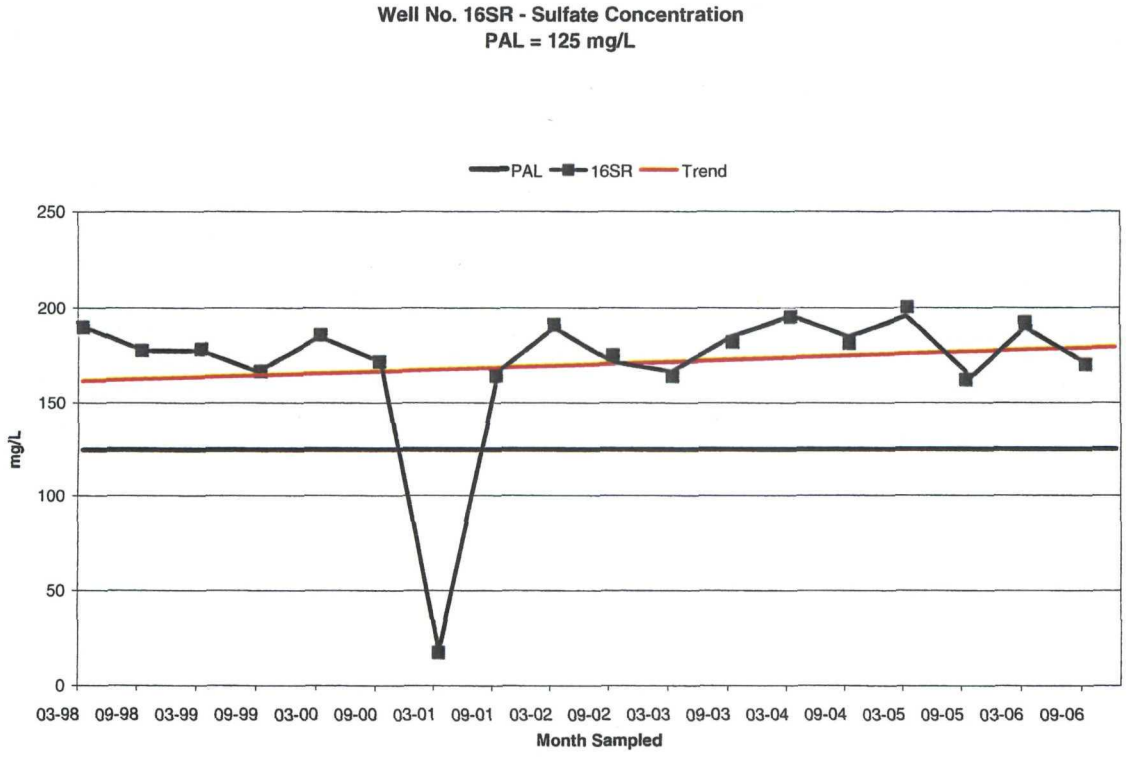


Figure 2 (cont.)
Sulfate Concentrations Above Preventive Action Limits (PALS)

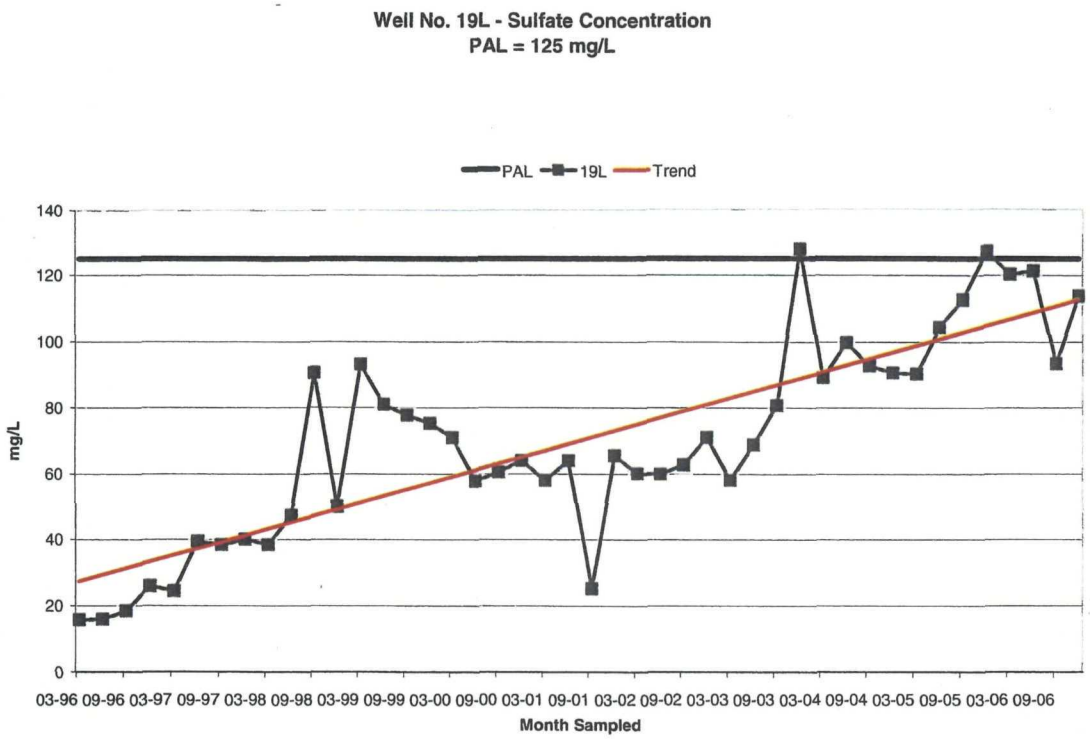
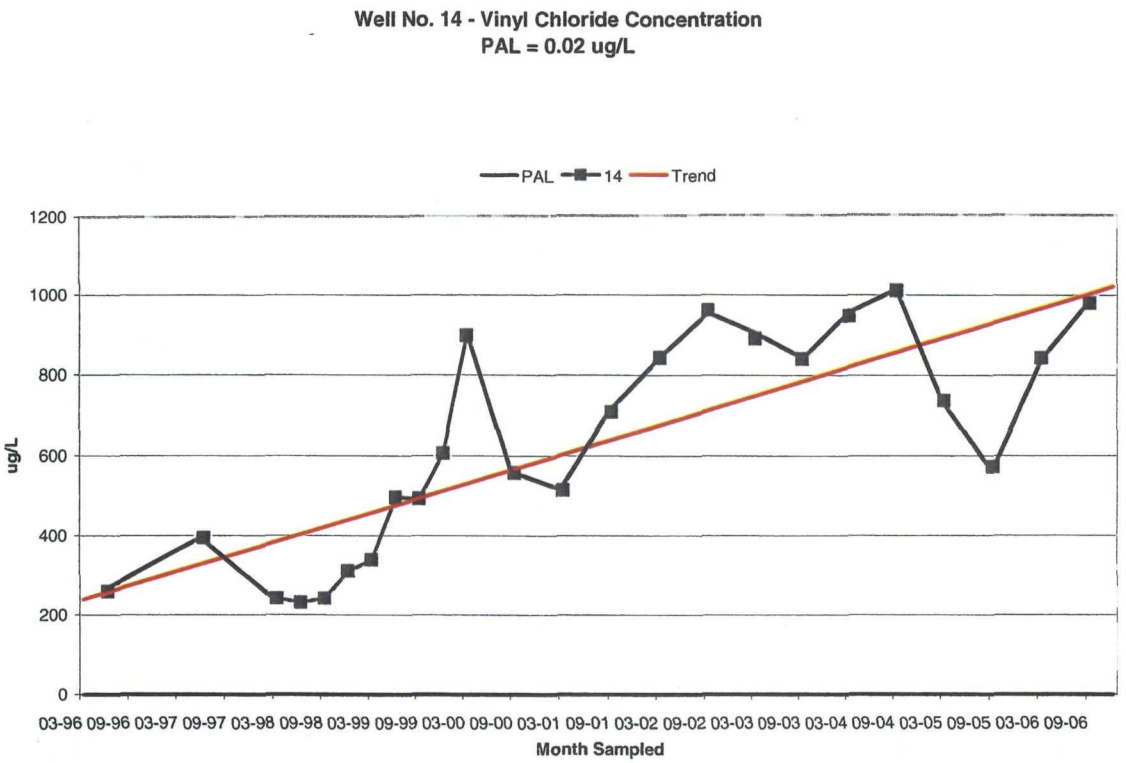


Figure 2 (cont.)
Sulfate Concentrations Above Preventive Action Limits (PALS)



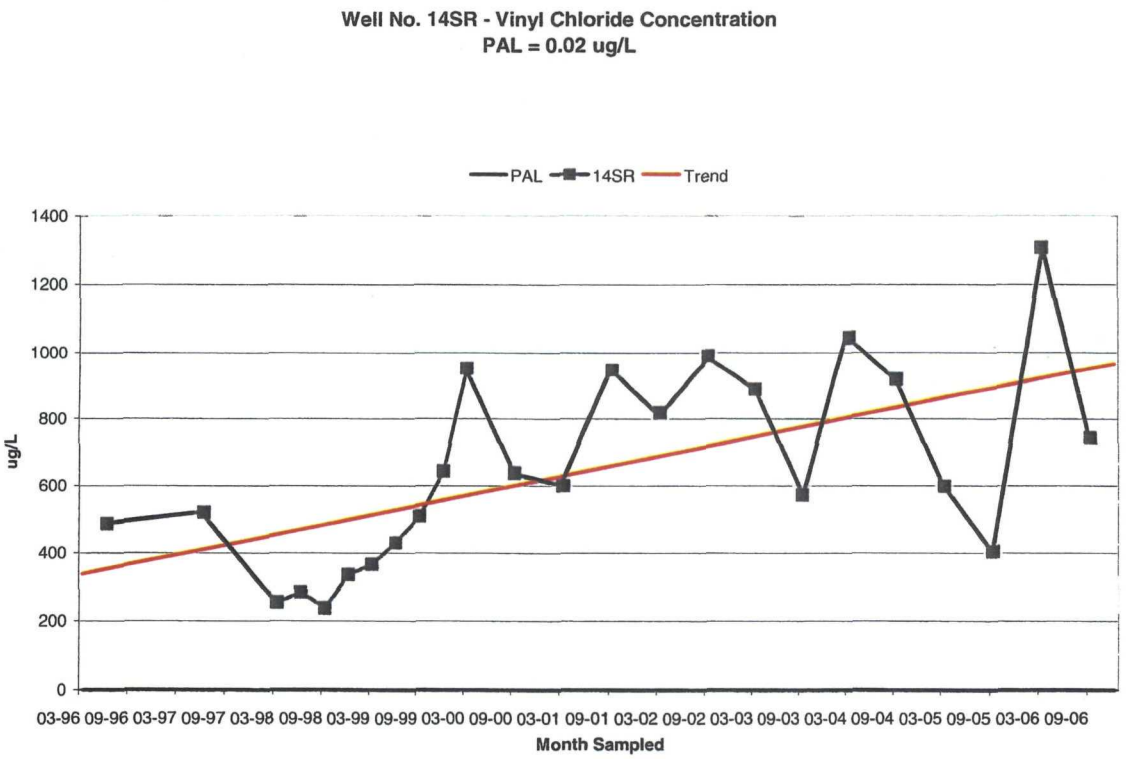
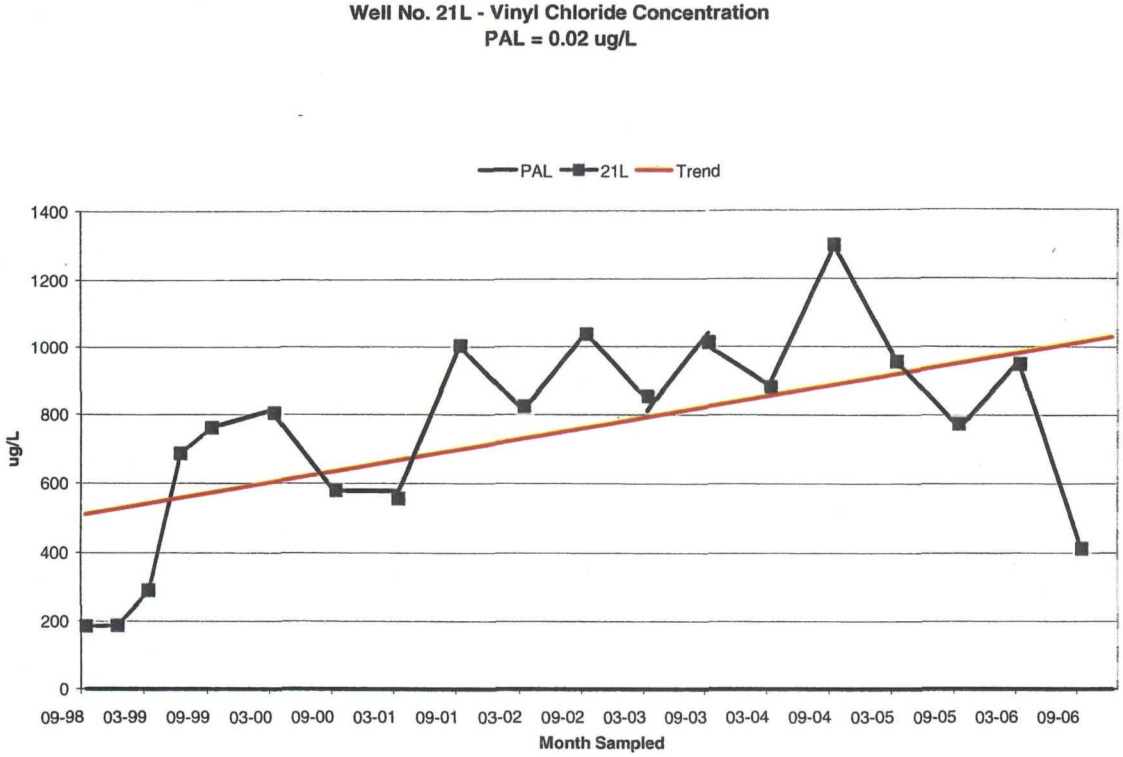


Figure 3 (cont.)
Vinyl Chloride Concentrations Above Preventive Action Limits (PALS)



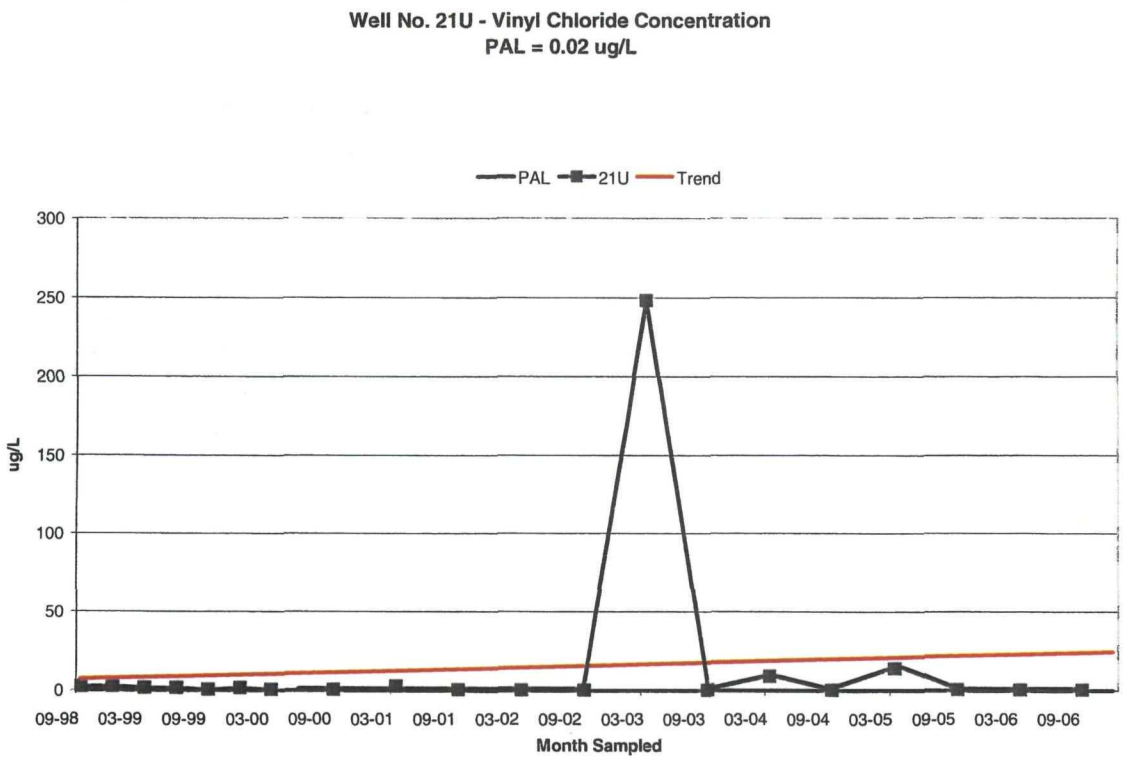
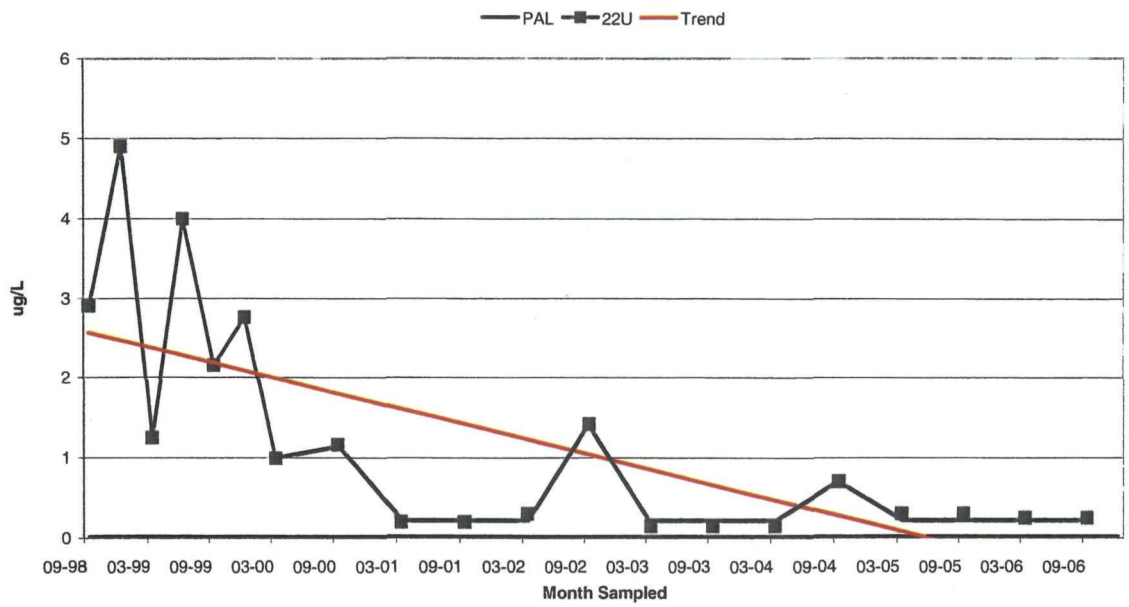


Figure 3 (cont.)
Vinyl Chloride Concentrations Above Preventive Action Limits (PALS)



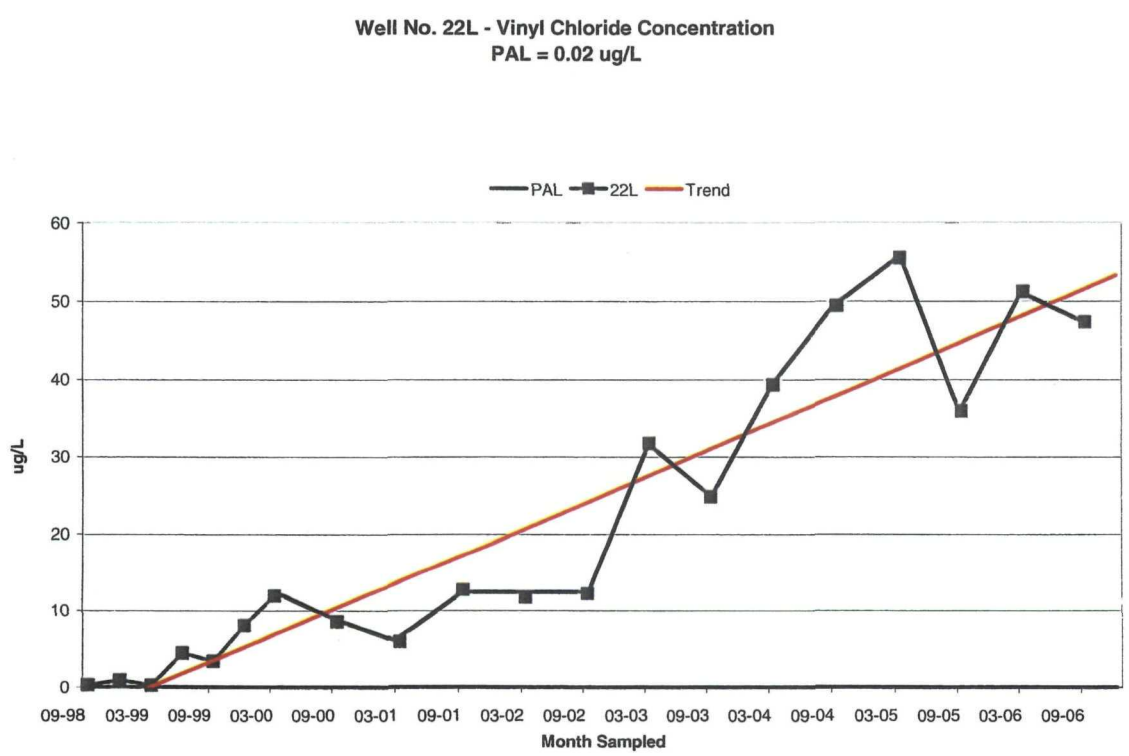
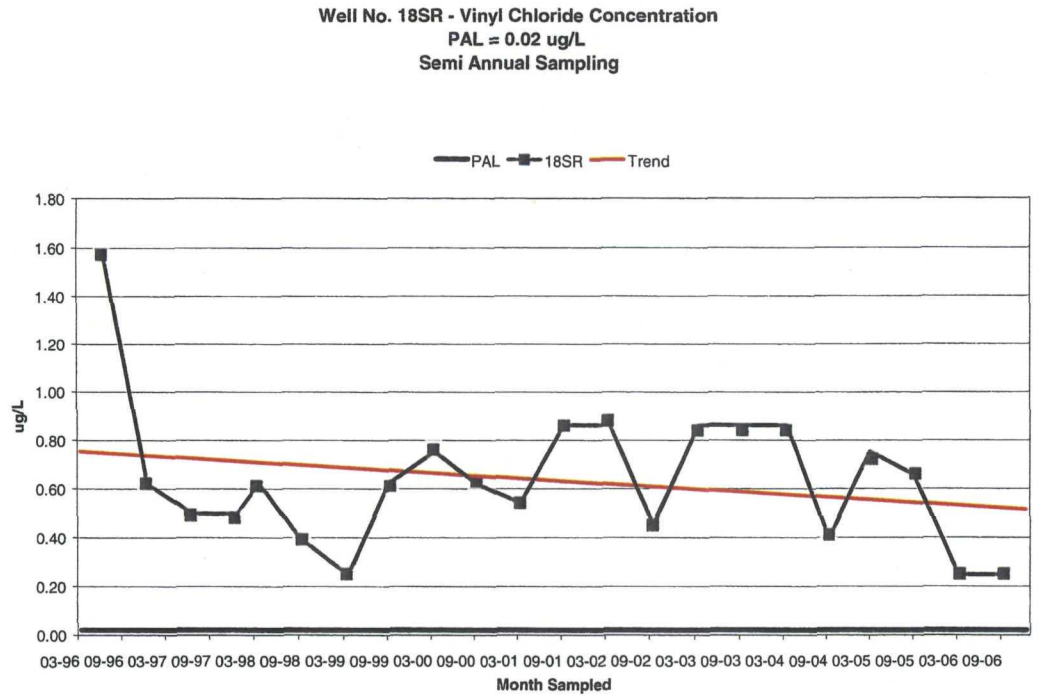


Figure 3 (cont.)
Vinyl Chloride Concentrations Above Preventive Action Limits (PALS)



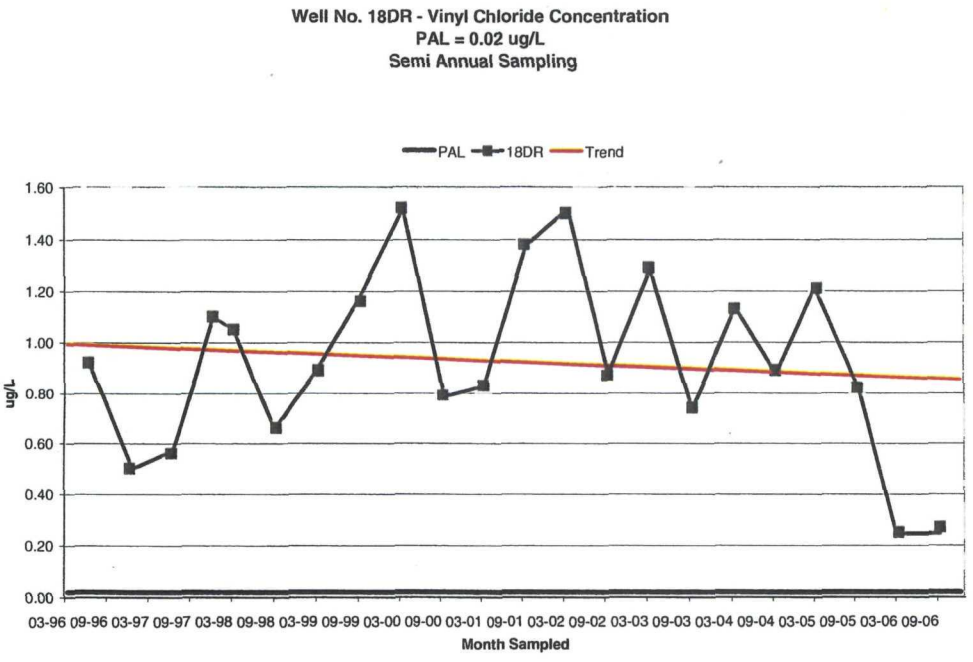
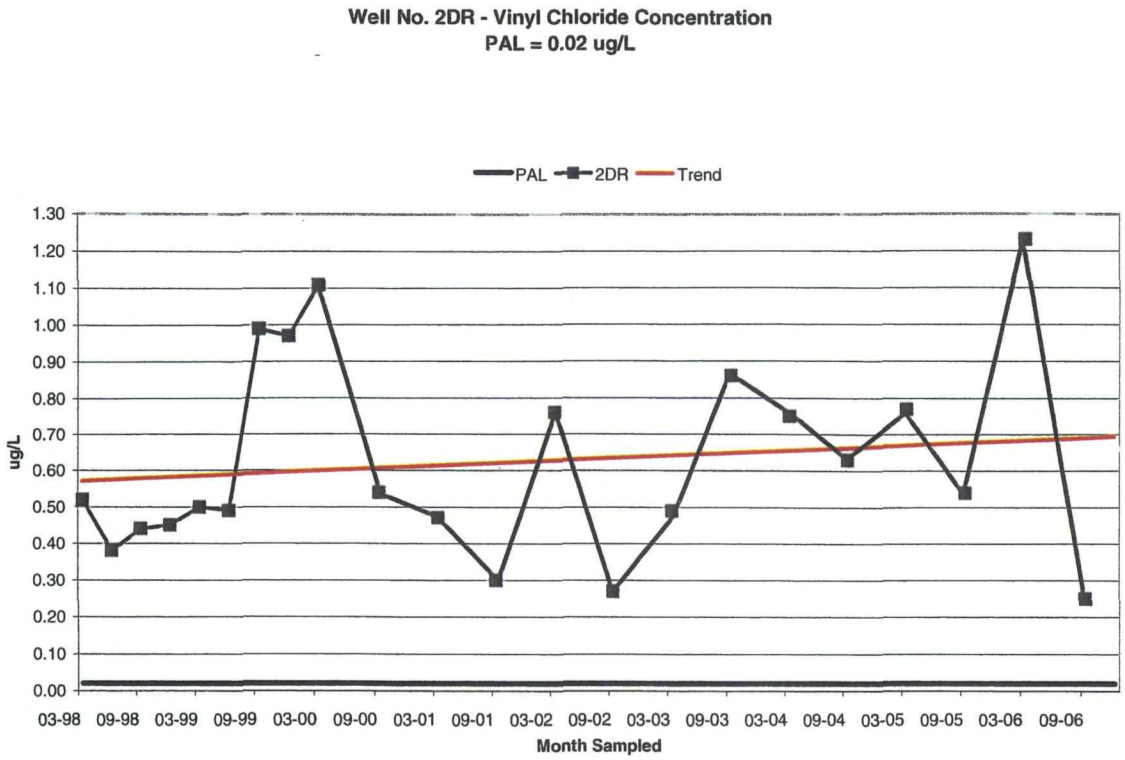


Figure 3 (cont.)
Vinyl Chloride Concentrations Above Preventive Action Limits (PALS)



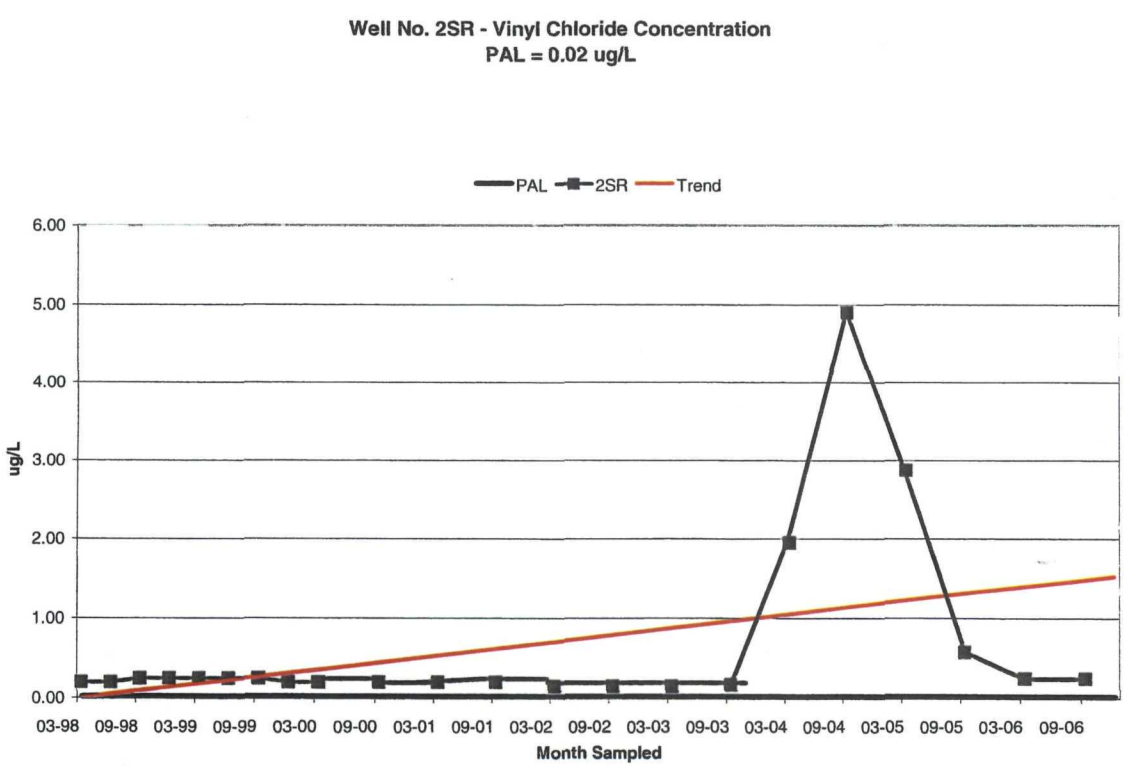
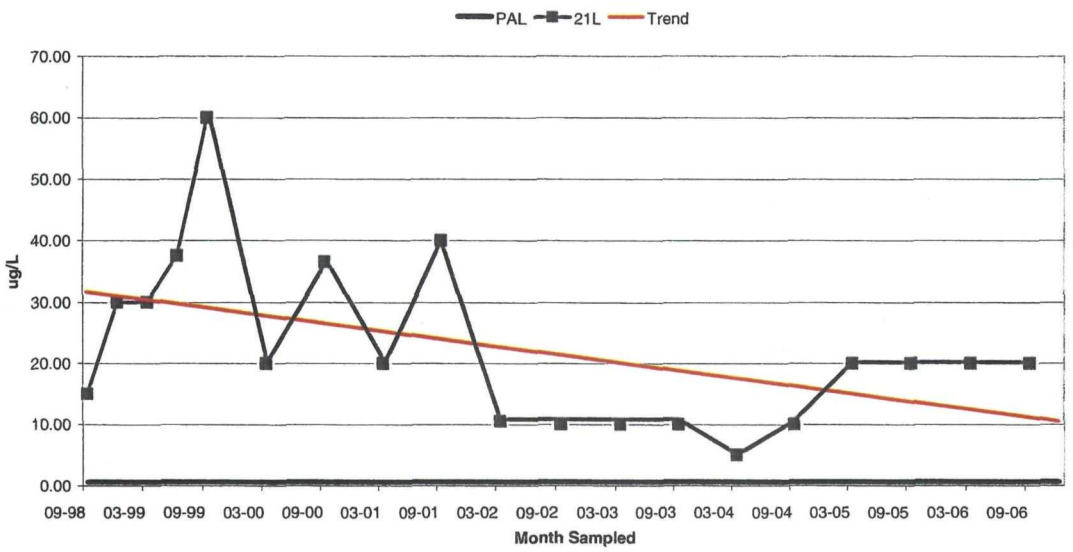


Figure 3 (cont.)
Vinyl Chloride Concentrations Above Preventive Action Limits (PALS)



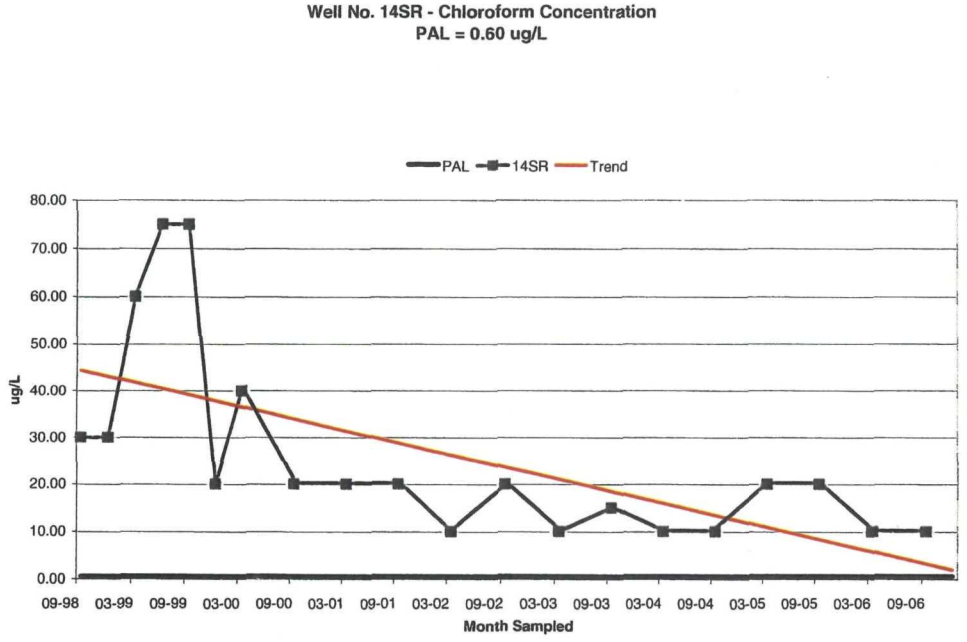
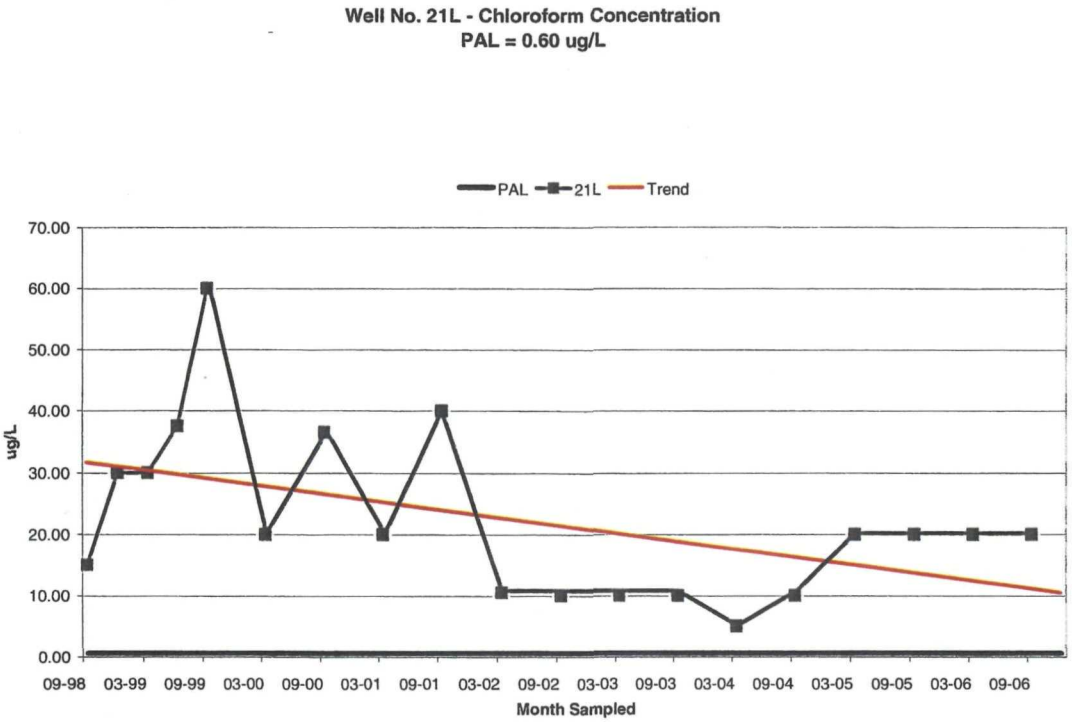


Figure 4
Chloroform Concentrations Above Preventive Action Limits (PALS)



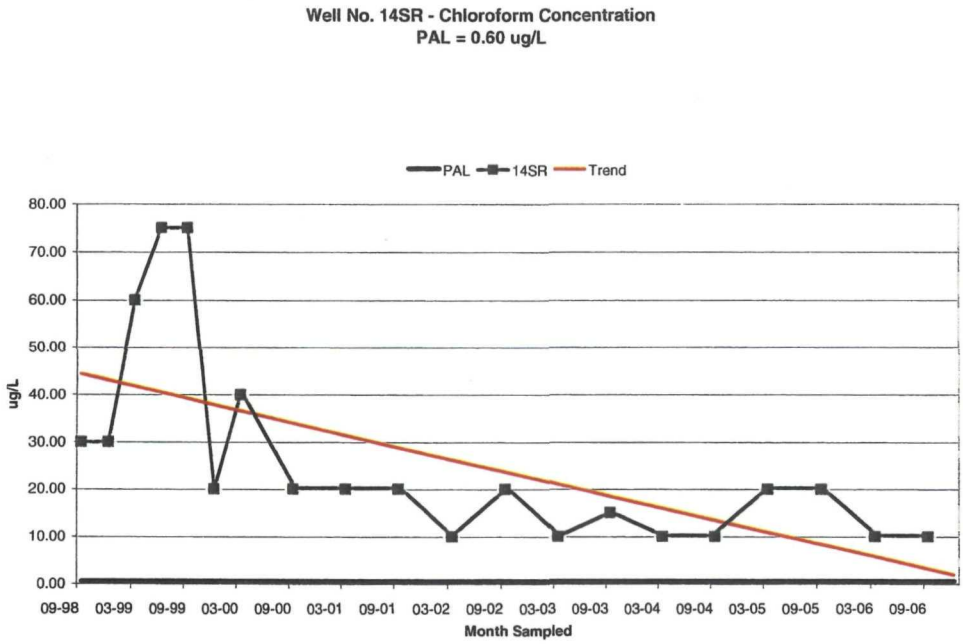
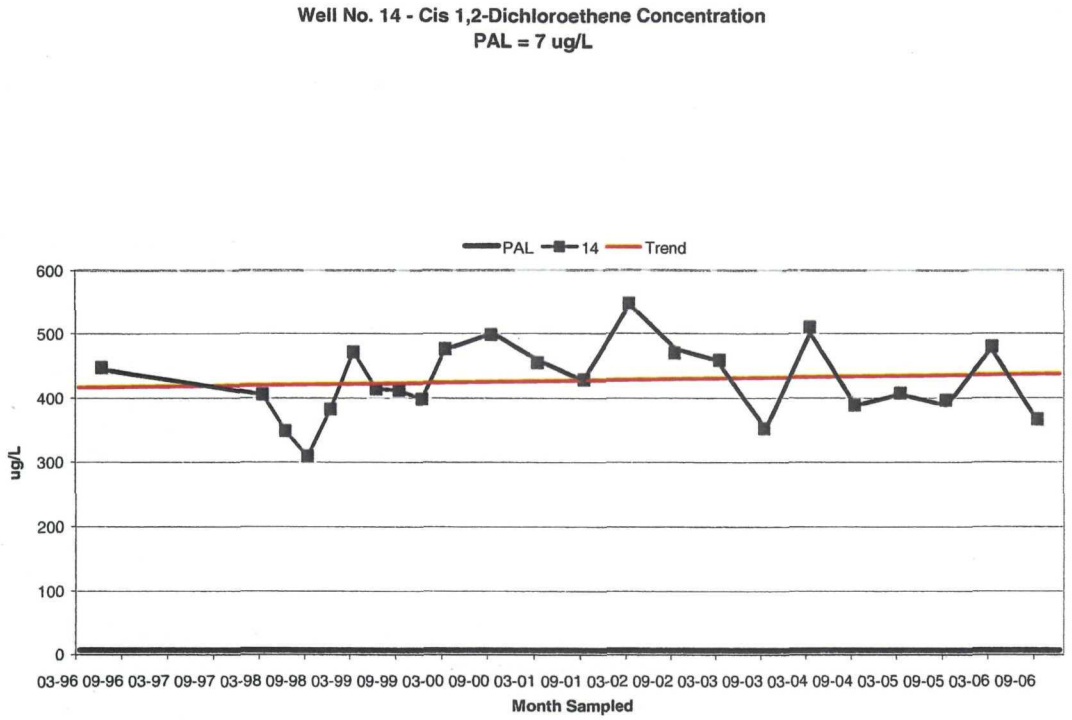


Figure 4
Chloroform Concentrations Above Preventive Action Limits (PALS)



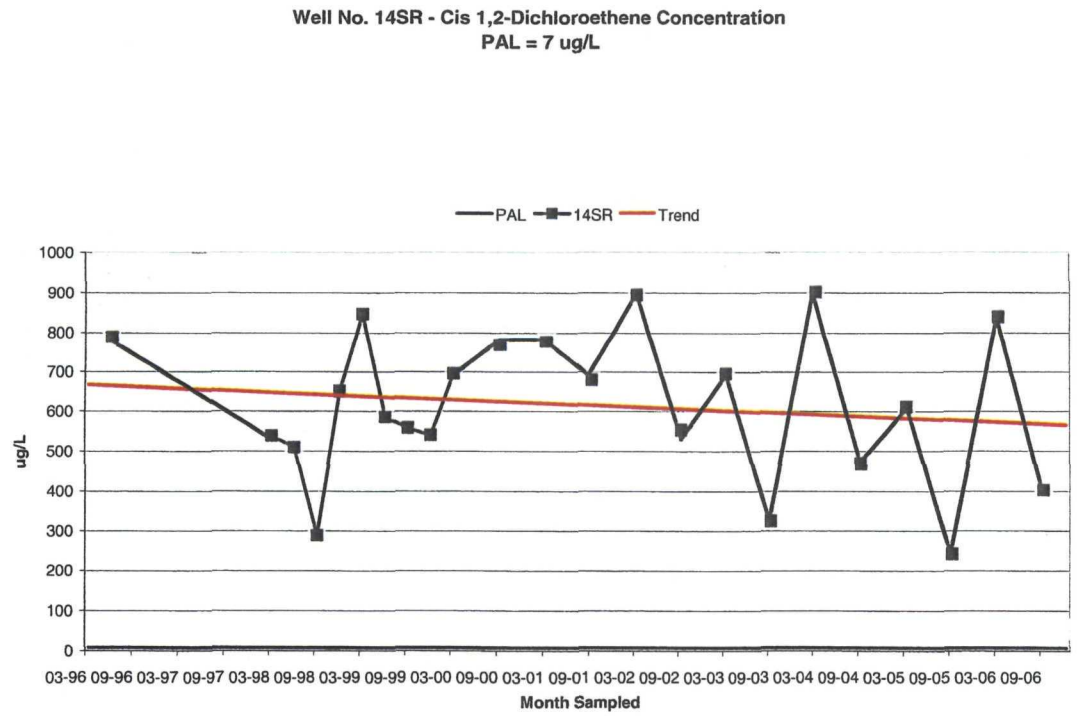
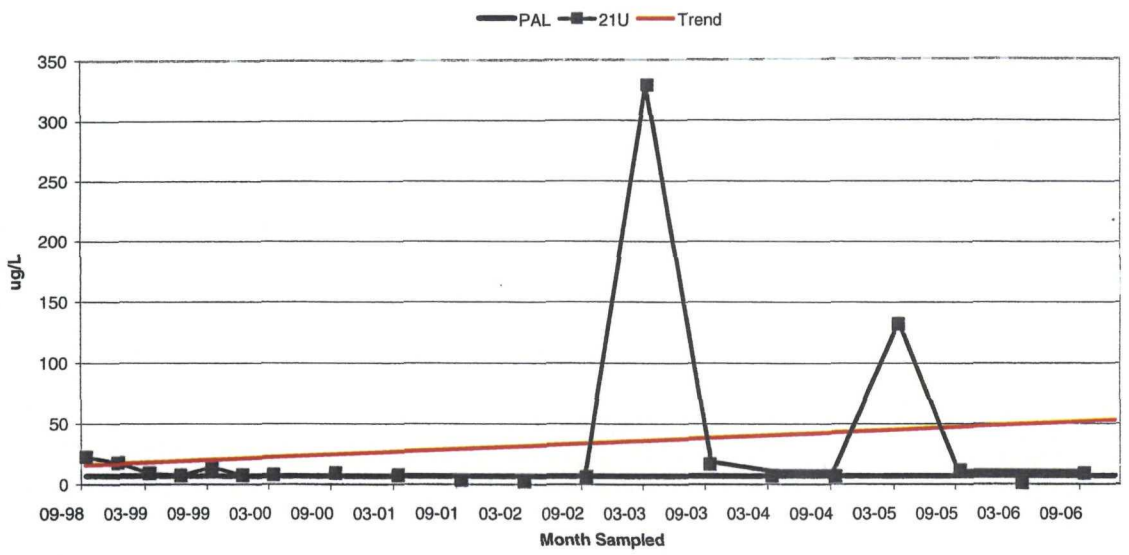


Figure 5
Cis 1,2-Dichloroethene Concentrations Above Preventive Action Limits (PALS)



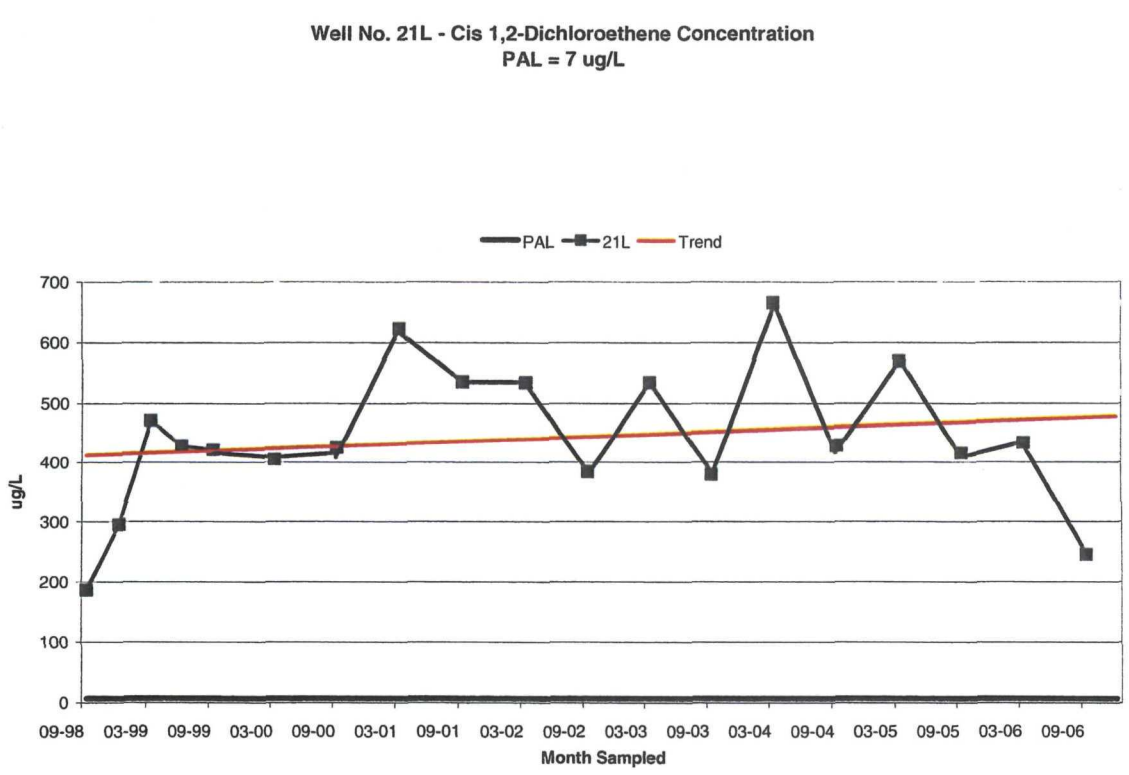


Figure 5 (cont.)
Cis 1,2-Dichloroethene Concentrations Above Preventive Action Limits (PALS)

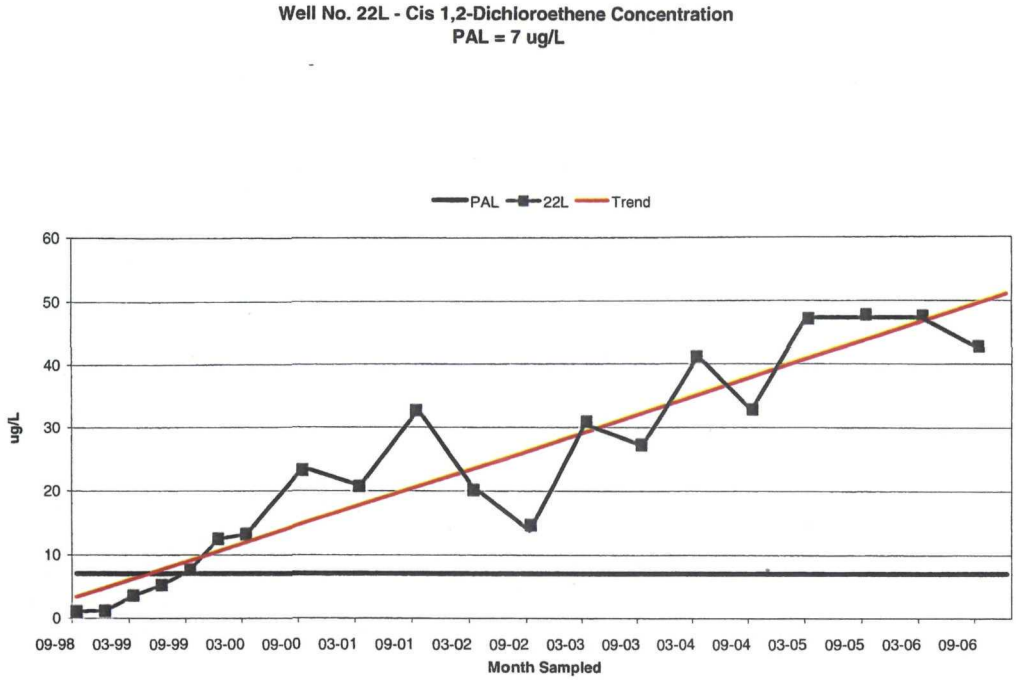
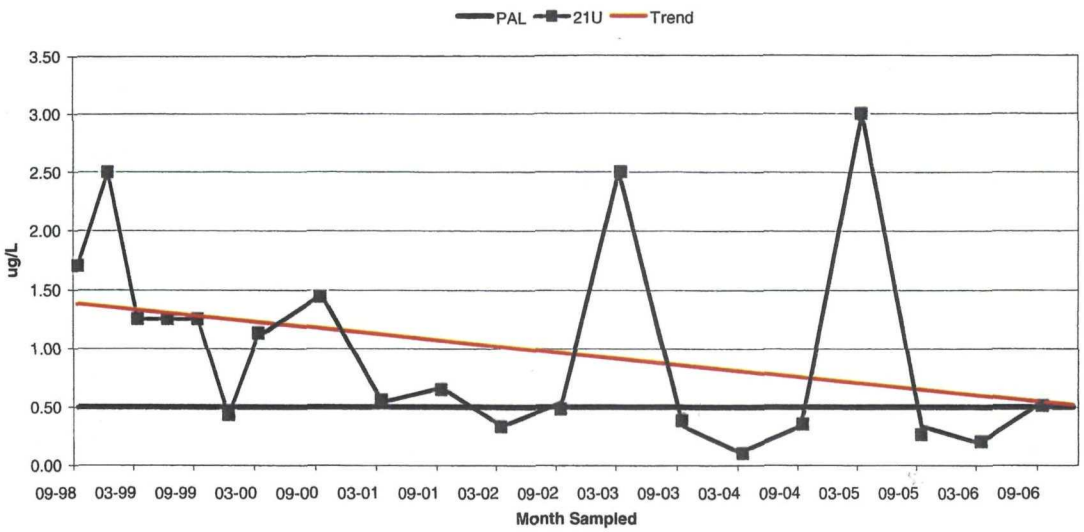


Figure 5 (cont.)
Cis 1,2-Dichloroethene Concentrations Above Preventive Action Limits (PALS)

Well No. 21U - Trichloroethene Concentration
PAL = 0.5 ug/L



Well No. 22U - Trichloroethene Concentration
PAL = 0.5 ug/L

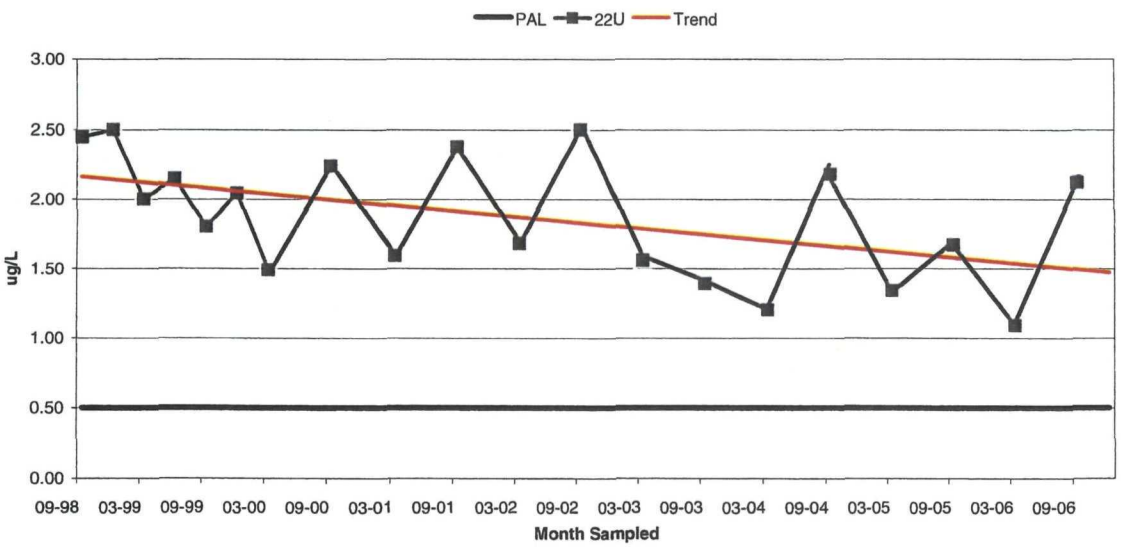
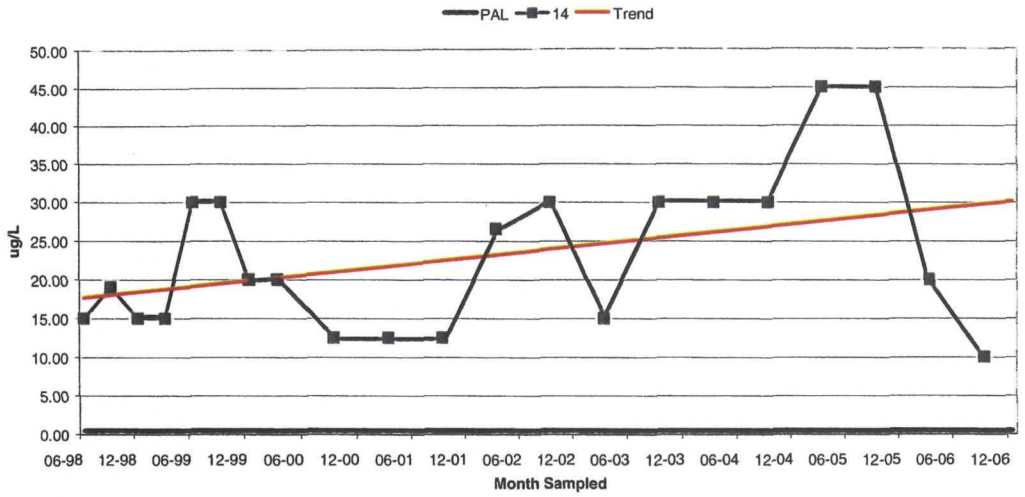


Figure 6
Trichloroethene Above Preventive Action Limits (PALS)

Well No. 14 - Methylene Chloride Concentration
PAL = 0.5 ug/L



Well No. 14SR - Methylene Chloride Concentration
PAL = 0.5 ug/L

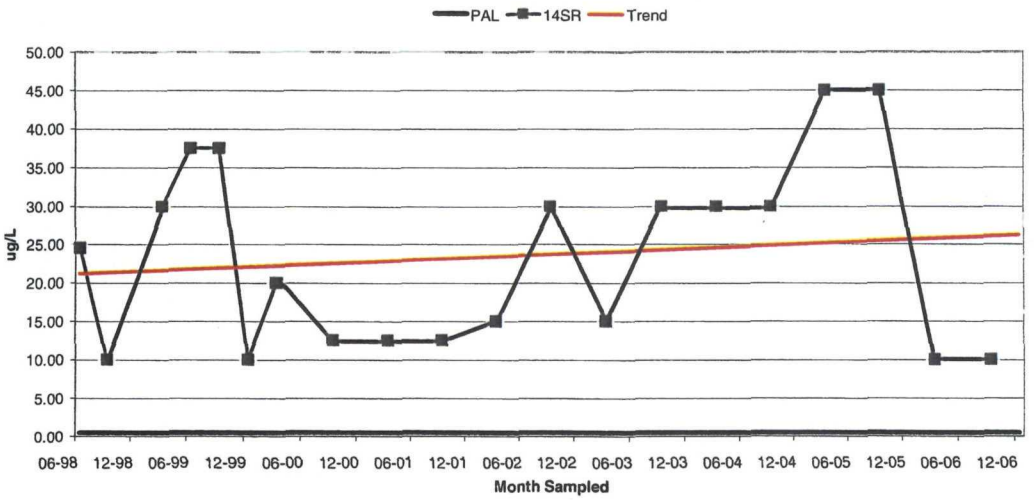
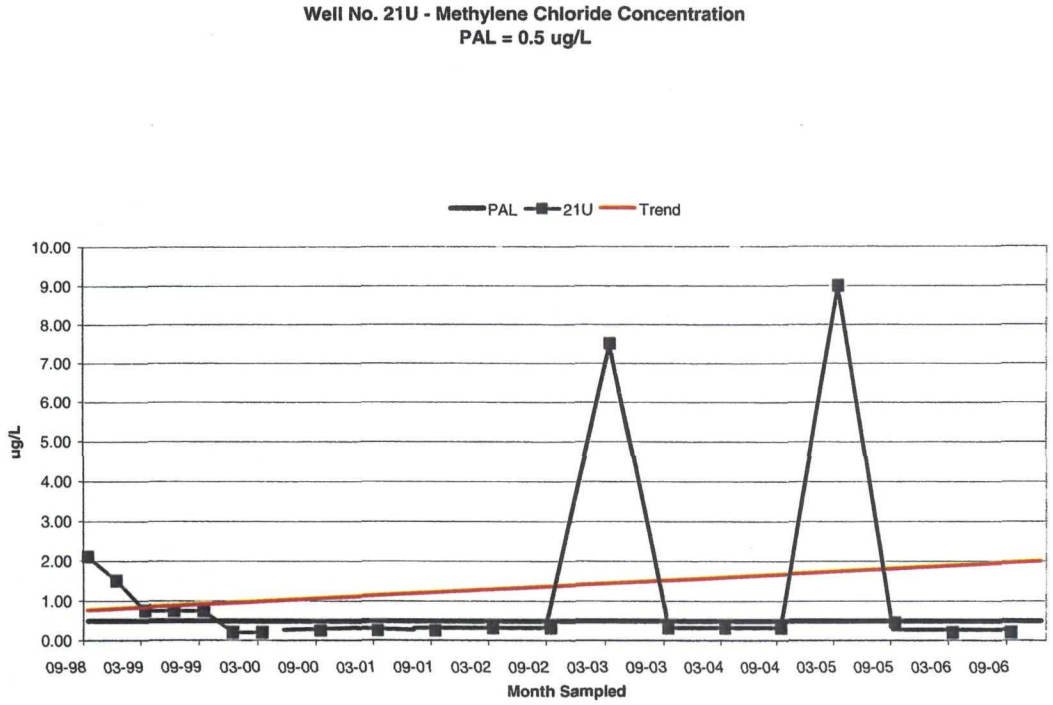


Figure 7
Methylene Chloride Concentrations Above Preventive Action Limits (PALS)



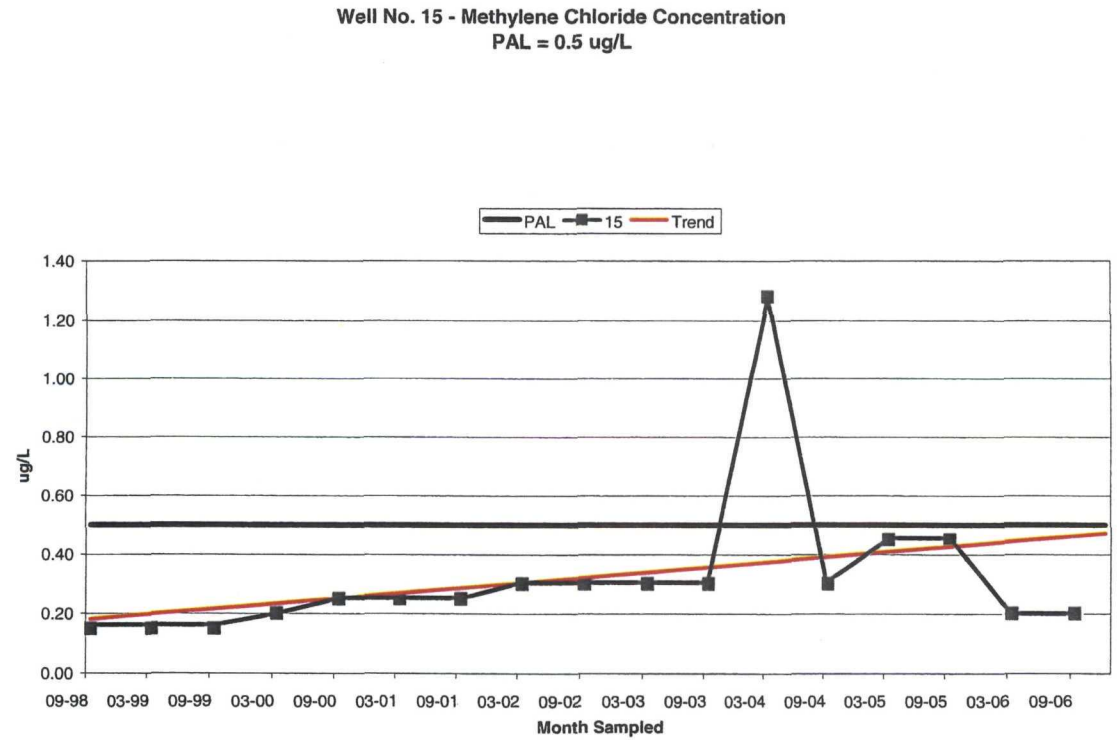
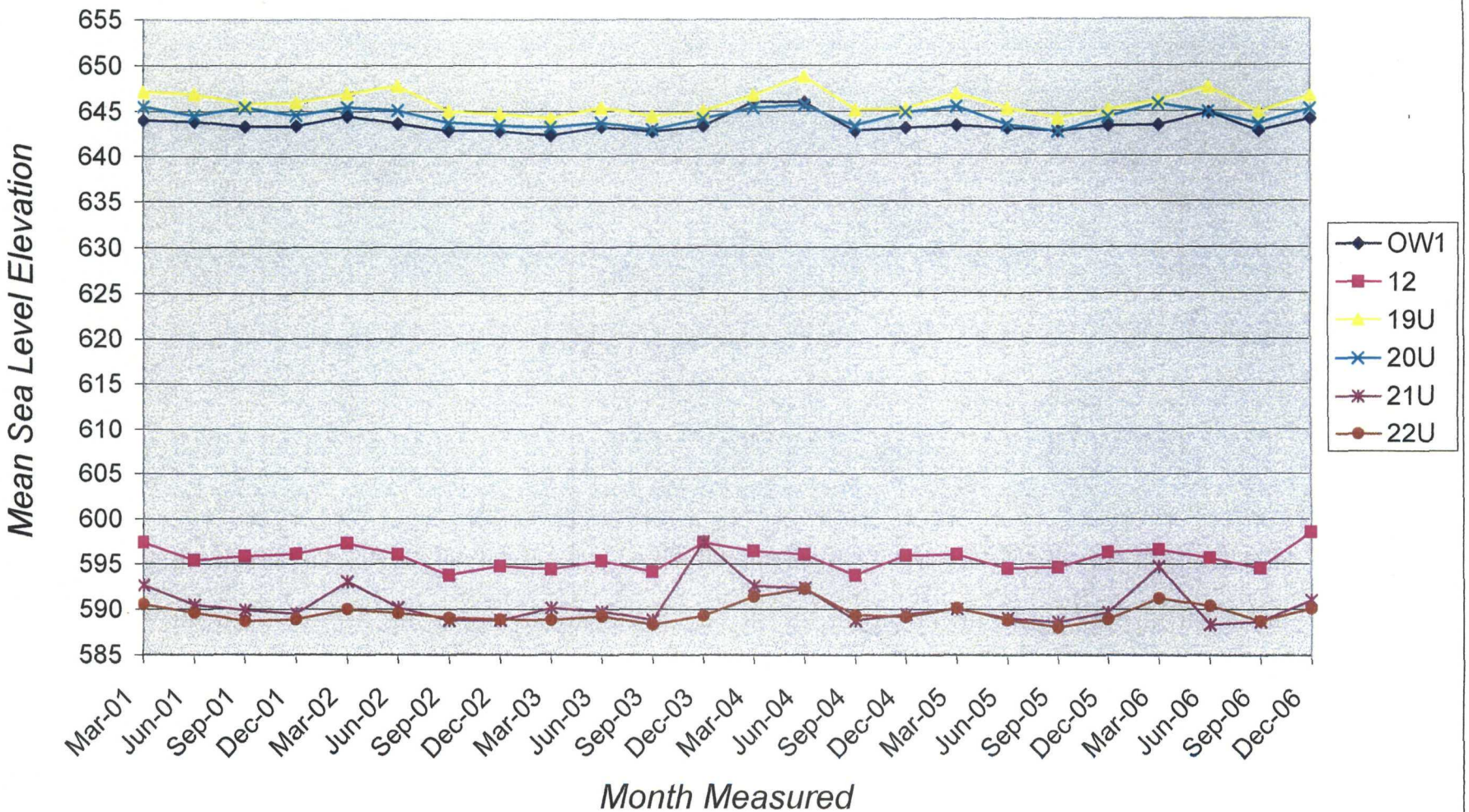
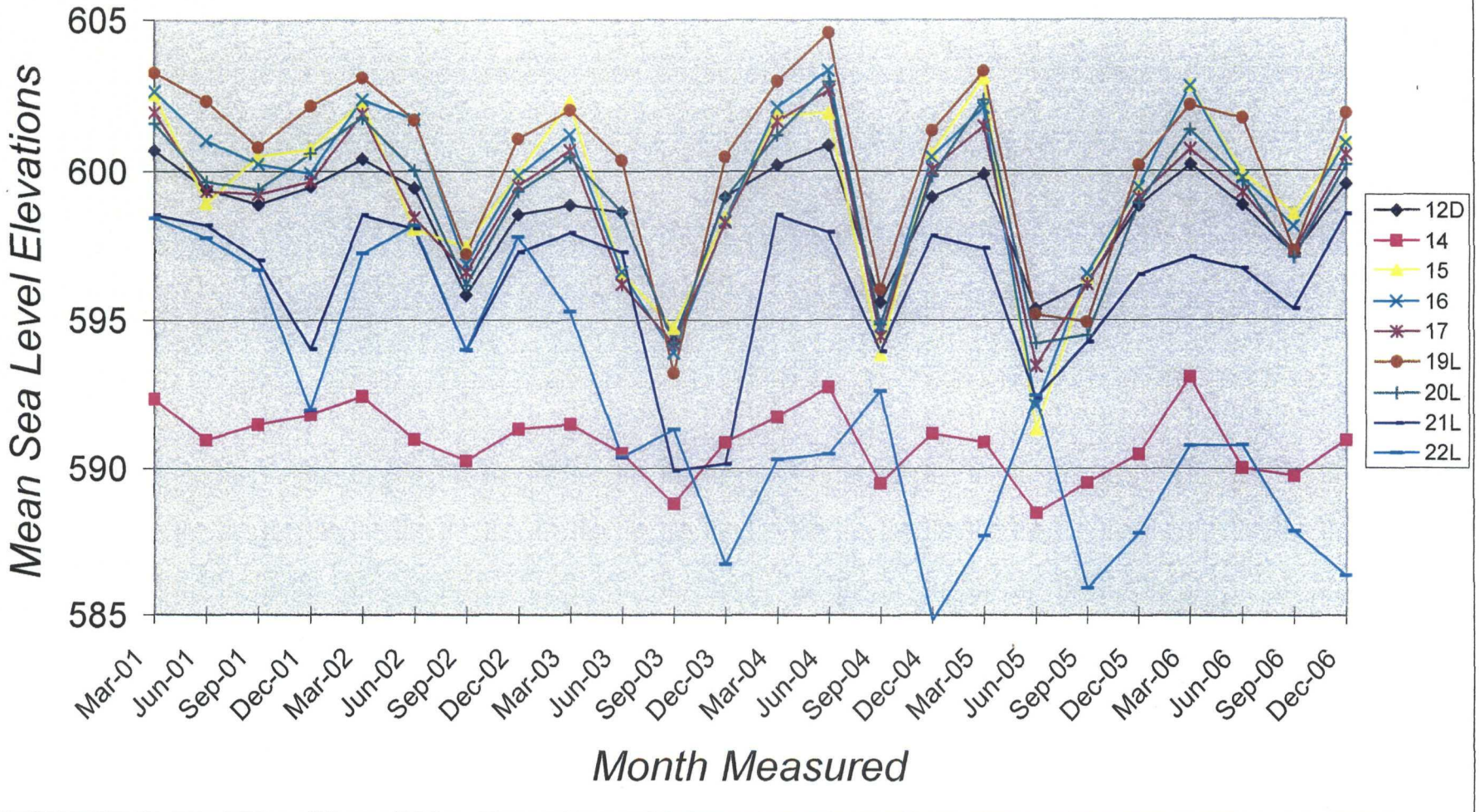


Figure 7 (cont.)
Methylene Chloride Concentrations Above Preventive Action Limits (PALS)

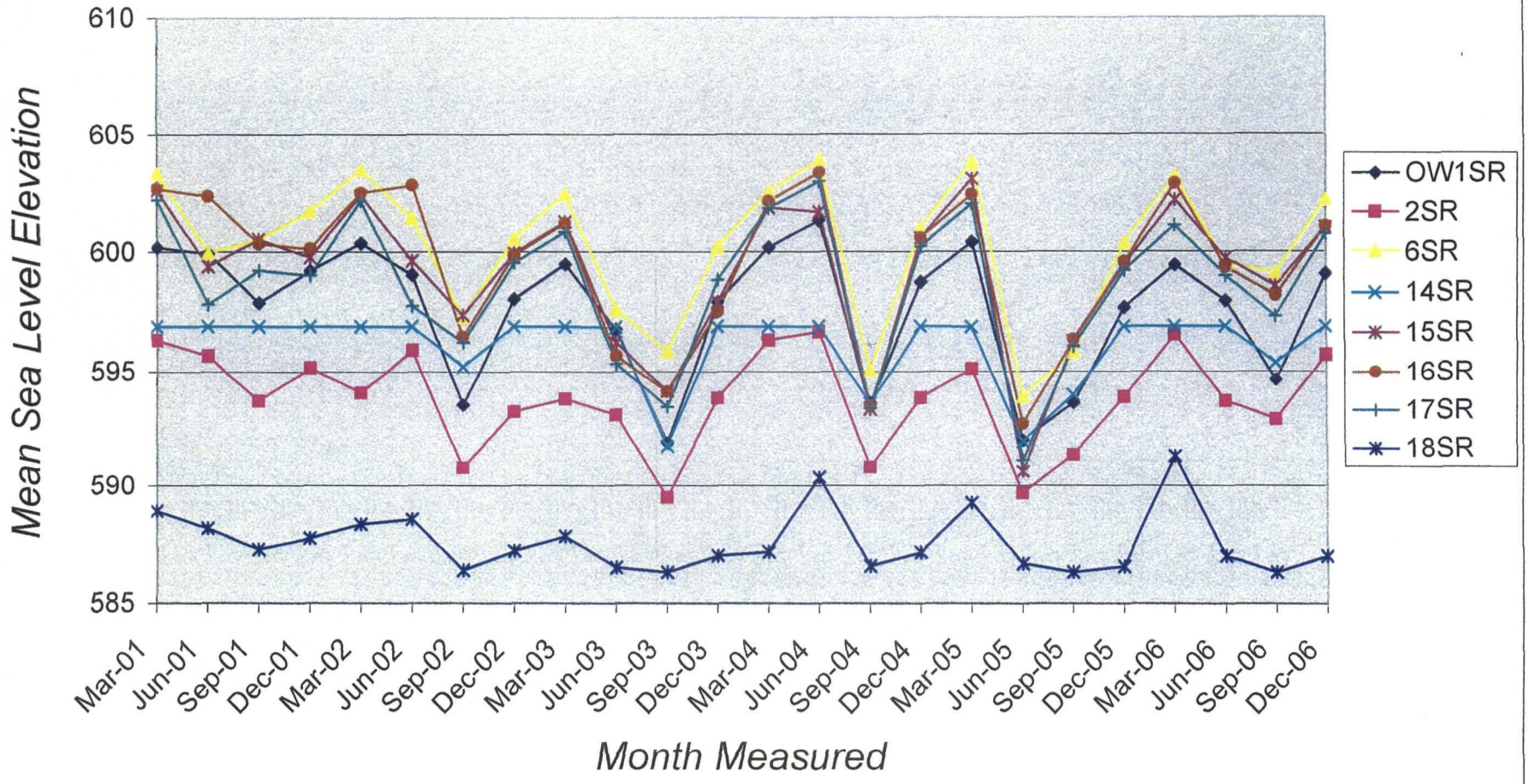
ALLUVIUM AND UPPER TILL GROUNDWATER ELEVATIONS
FIGURE 8



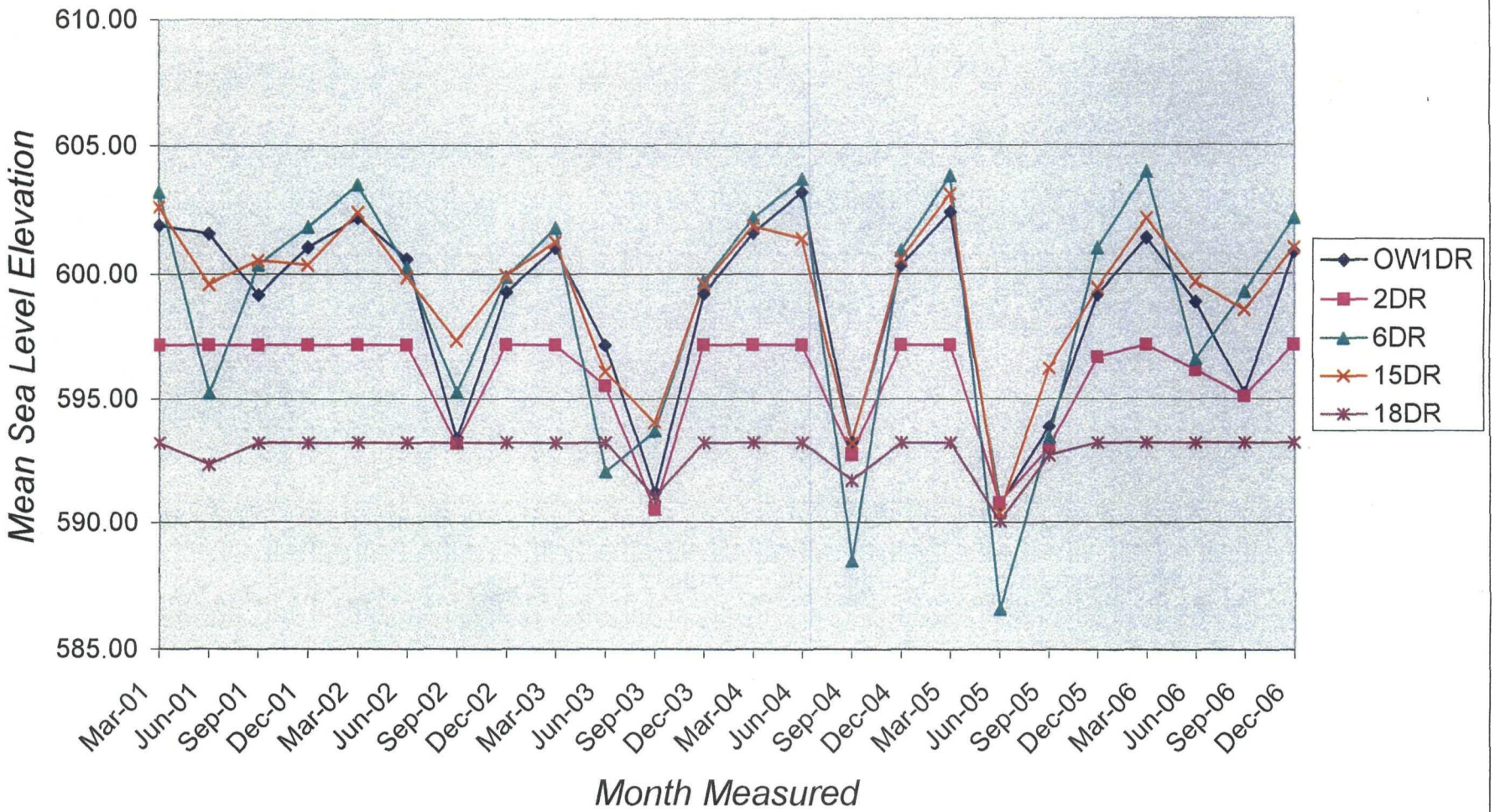
LOWER TILL GROUNDWATER ELEVATIONS
FIGURE 9

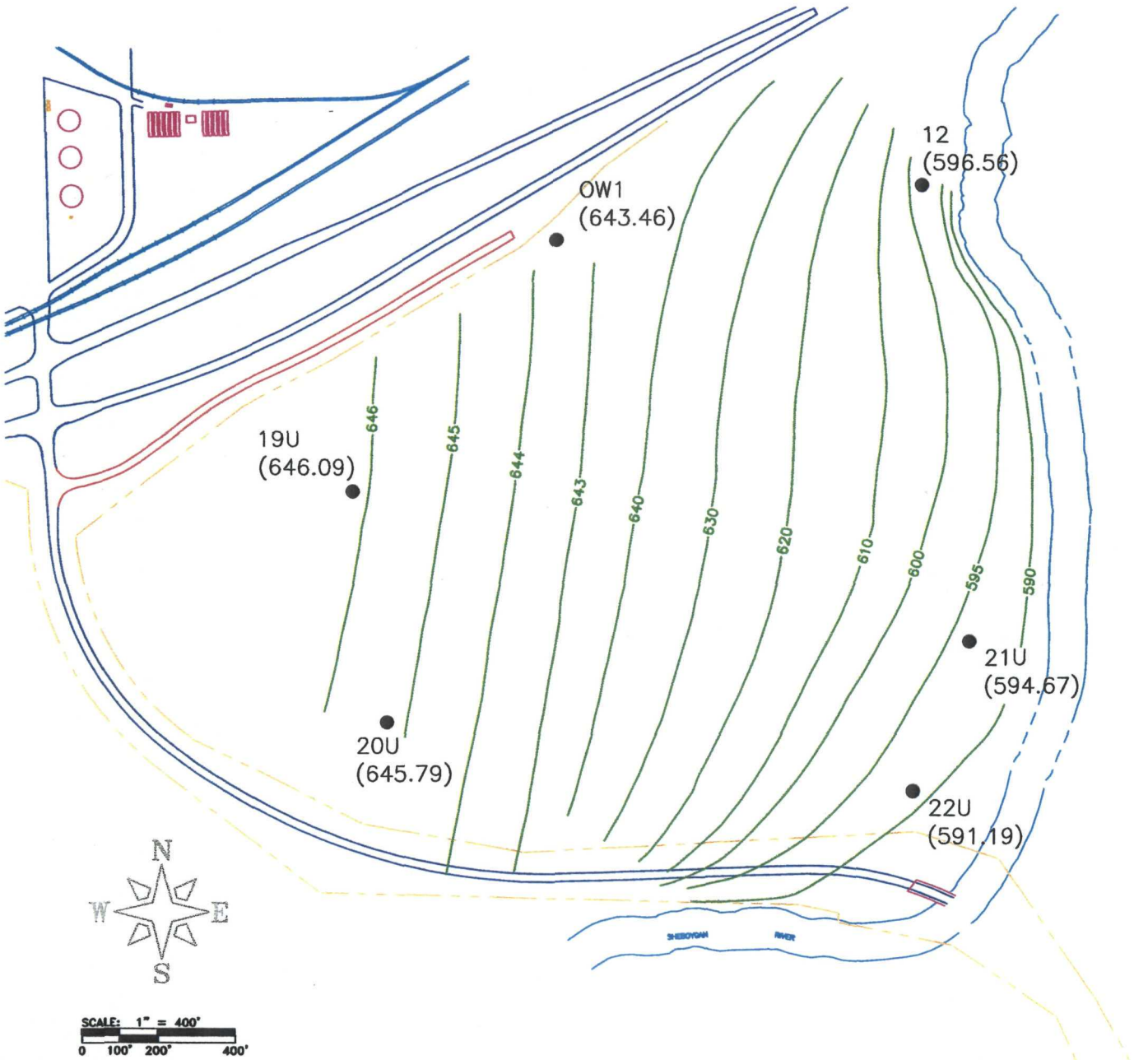


SHALLOW BEDROCK GROUNDWATER ELEVATIONS
FIGURE 10



DEEP BEDROCK GROUNDWATER ELEVATIONS
FIGURE 11





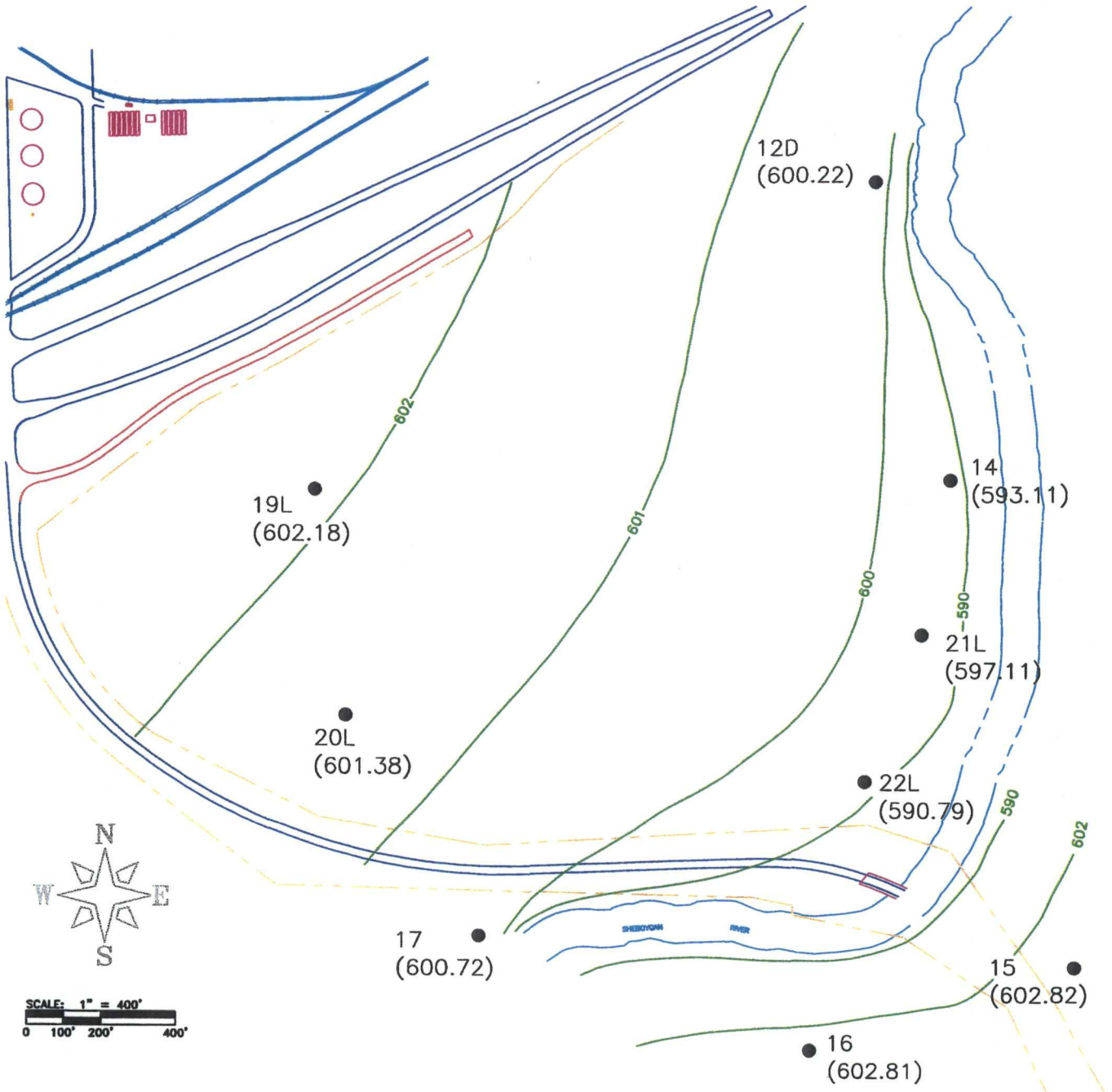
LEGEND

- EXISTING WELL
- CONTOUR (DASHED WHERE INFERRED) DATUM: MEAN SEA LEVEL DATA FROM 03/06

FIGURE 12

ALLUVIUM AND UPPER TILL
WATER TABLE MAP
MARCH 2006
KOHLER CO. LANDFILL
KOHLER, WISCONSIN

1001-710-021-0011.DWG R.P./CJU 02/16/2007



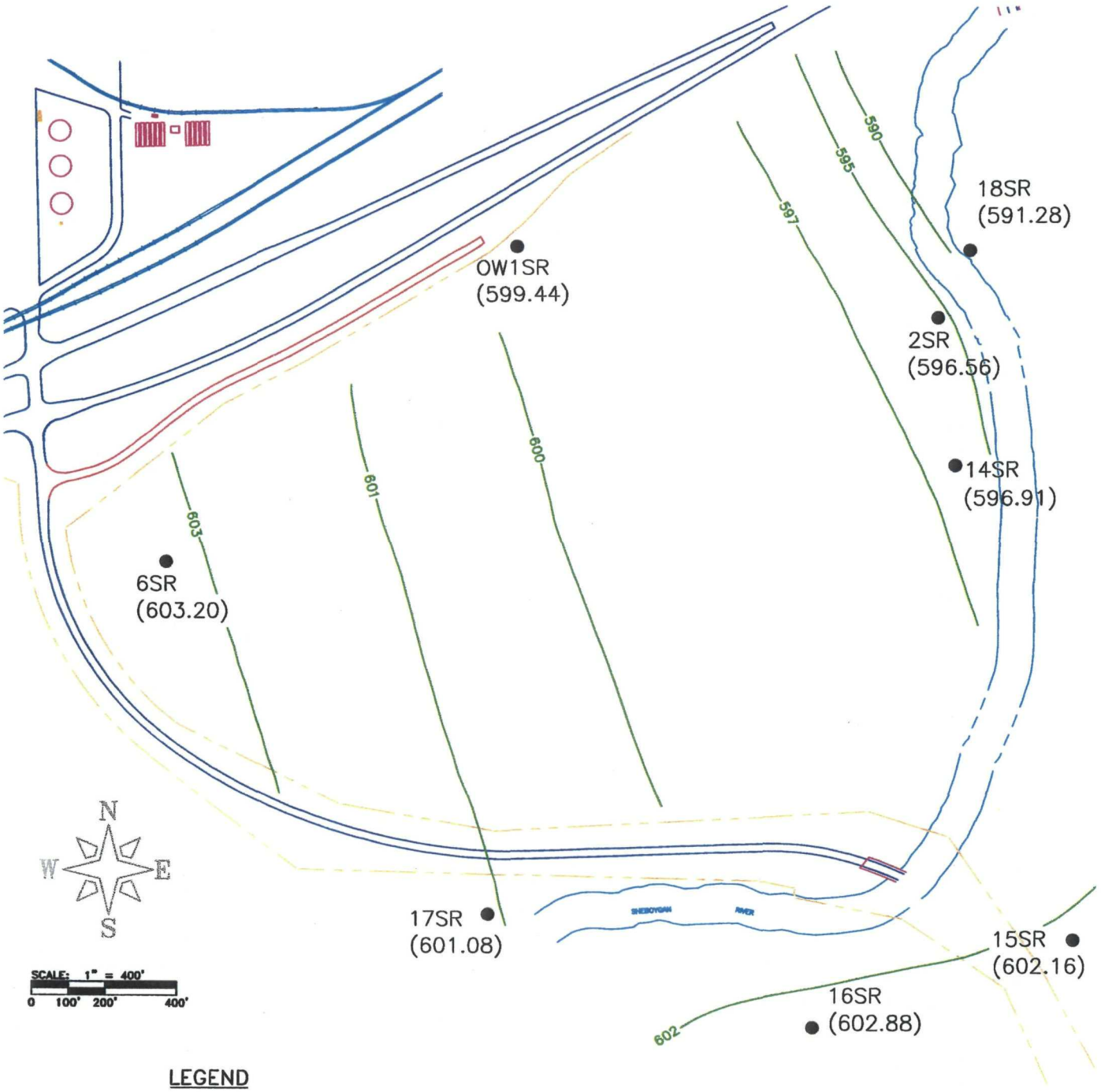
LEGEND

- EXISTING WELL
- CONTOUR (DASHED WHERE INFERRED)
  DATUM: MEAN SEA LEVEL
  DATA FROM 03/06

FIGURE 13

LOWER TILL
POTENTIOMETRIC SURFACE MAP
MARCH 2006
KOHLER CO. LANDFILL
KOHLER, WISCONSIN

1001-710-021-0011.DWG R.P./CJU 02/16/2007



LEGEND

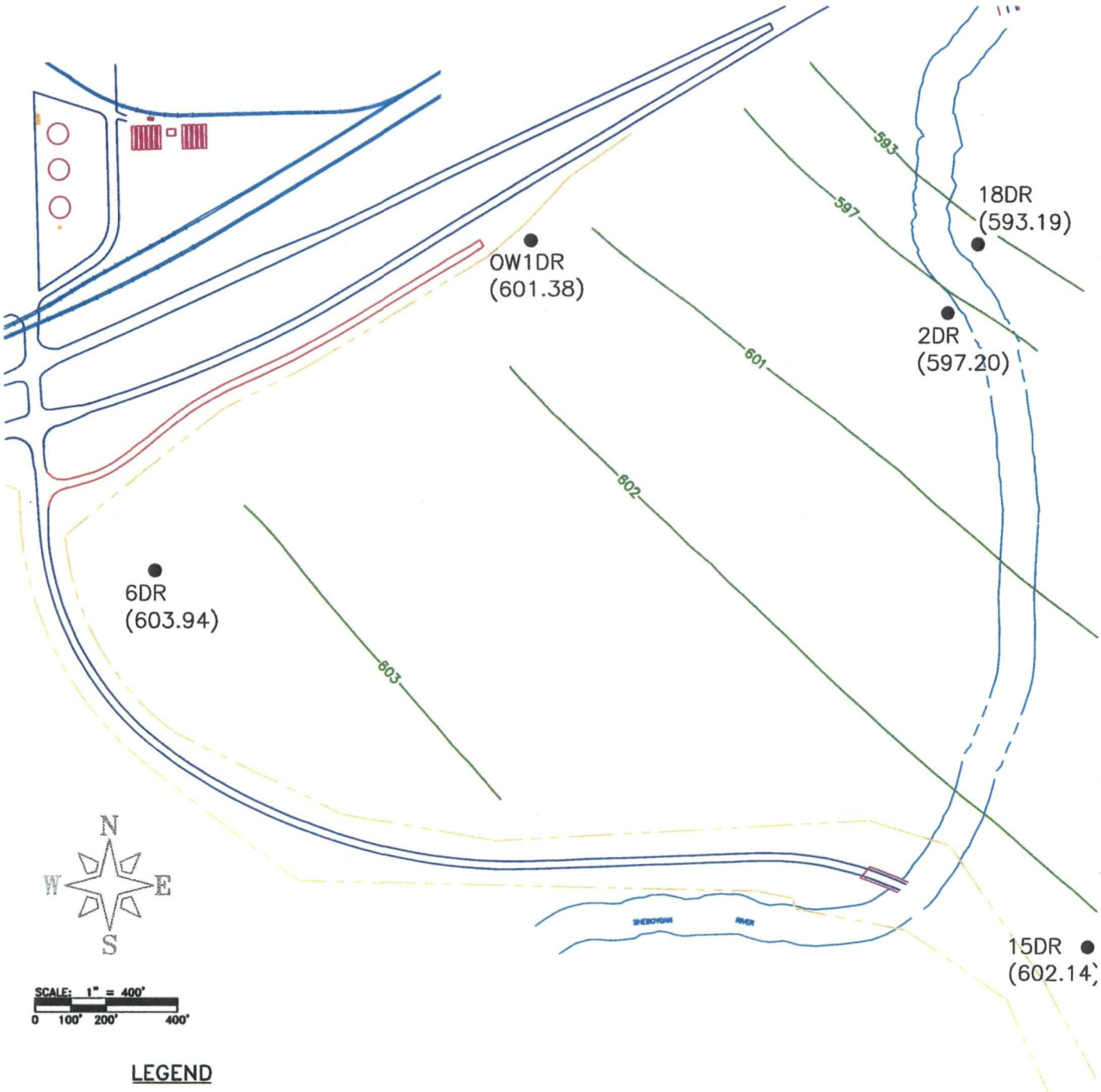
- ● EXISTING WELL
- ~ CONTOUR (DASHED WHERE INFERRED)

DATUM: MEAN SEA LEVEL
DATA FROM 03/06

FIGURE 14

SHALLOW BEDROCK
POTENTIOMETRIC SURFACE MAP
MARCH 2006
KOHLER CO. LANDFILL
KOHLER, WISCONSIN

1001-710-021-0011.DWG R.P./CJU 02/16/2007



LEGEND

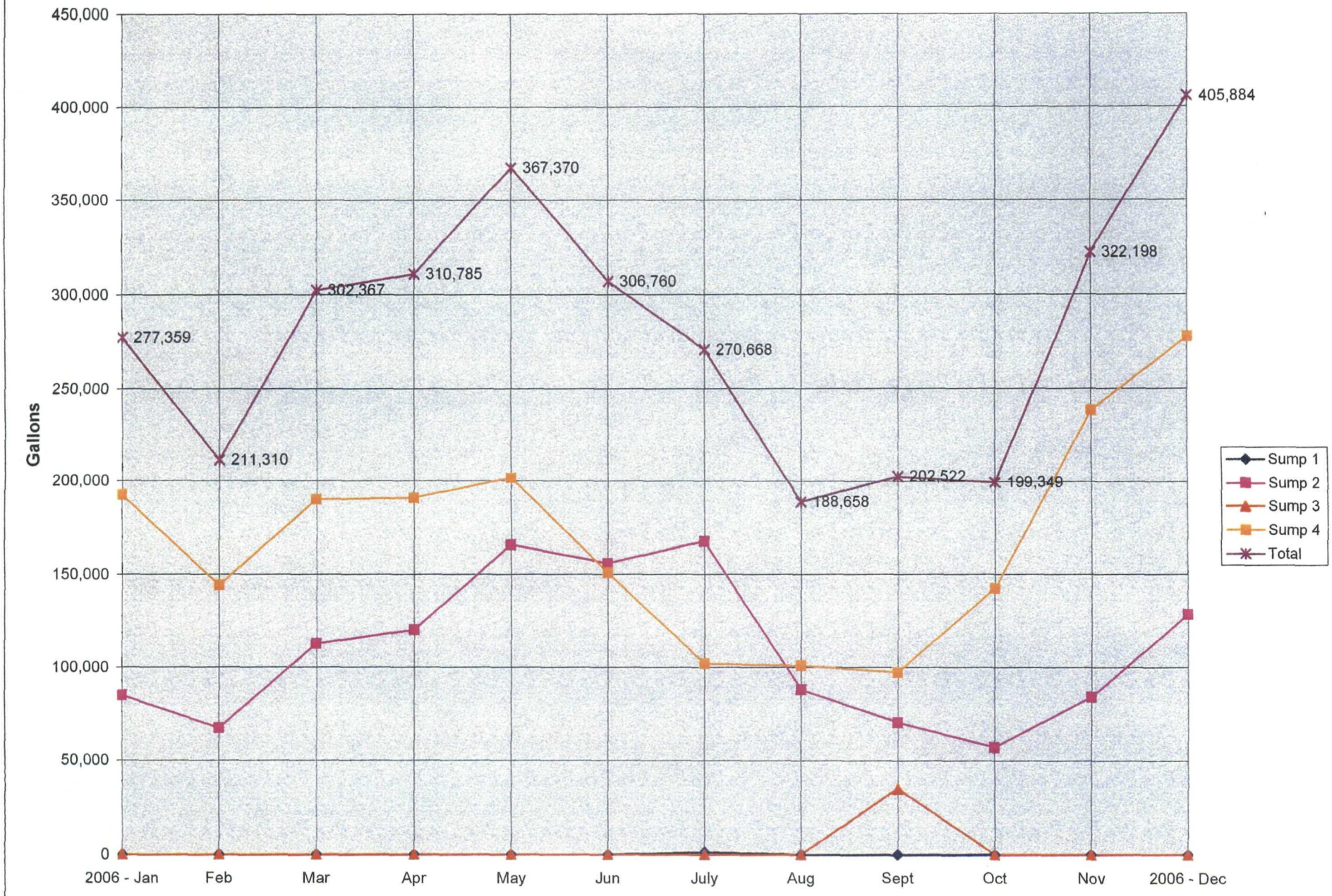
- EXISTING WELL
- CONTOUR (DASHED WHERE INFERRED)
  DATUM: MEAN SEA LEVEL
  DATA FROM 03/06

FIGURE 15

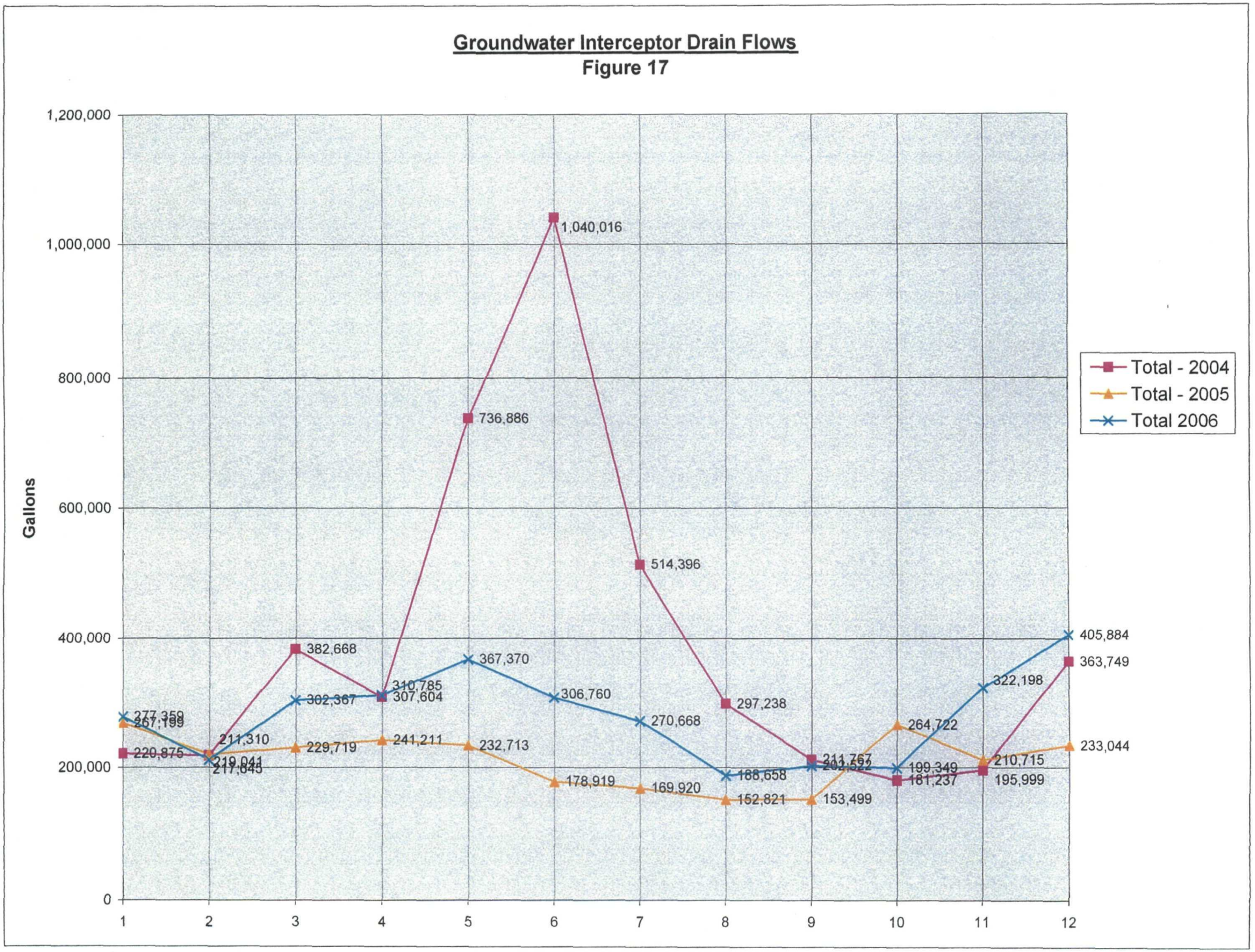
DEEP BEDROCK
POTENTIOMETRIC SURFACE MAP
MARCH 2006
KOHLER CO. LANDFILL
KOHLER, WISCONSIN

1001-710-021-0011.DWG R.P./CJU 02/16/2007

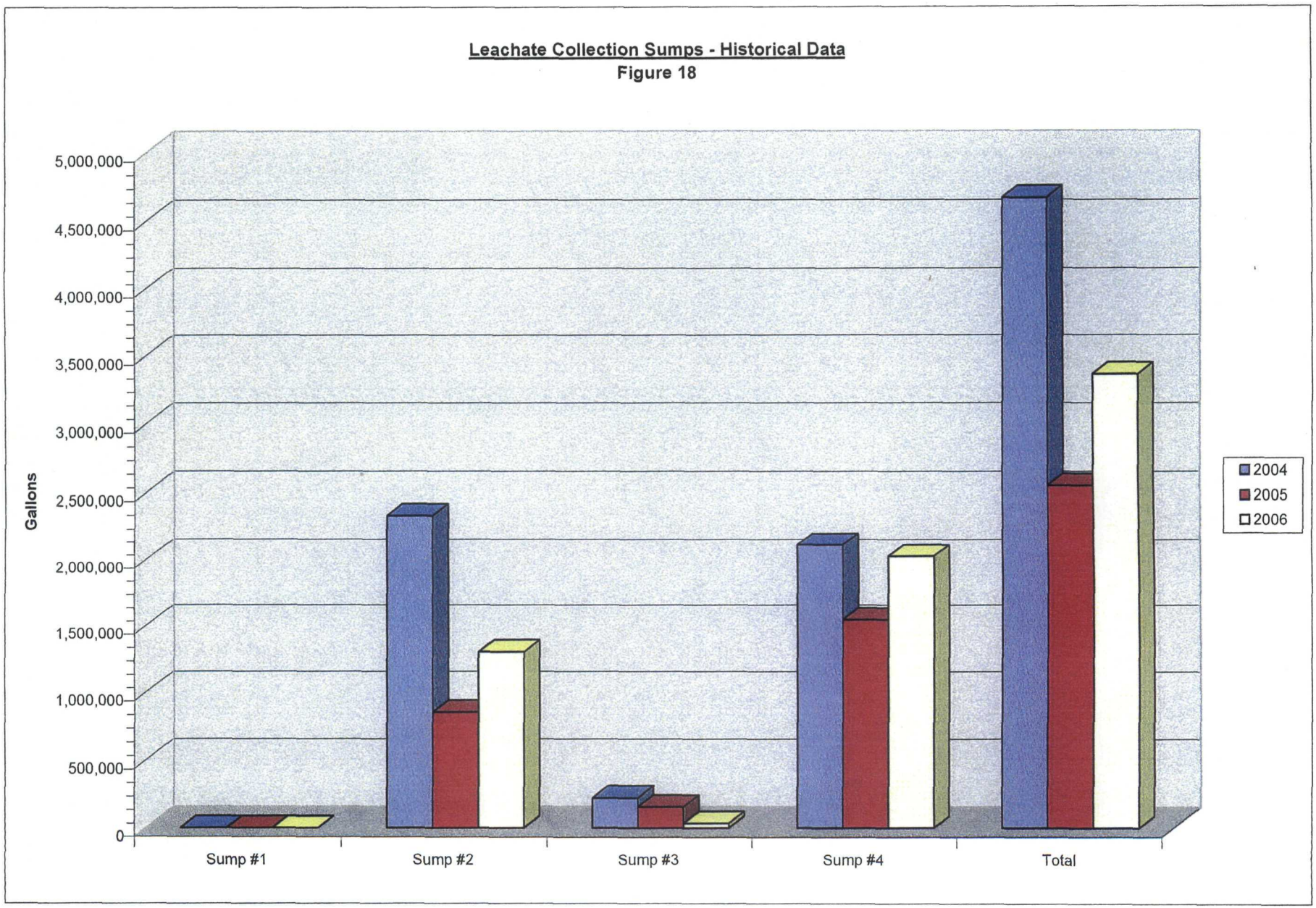
Groundwater Interceptor Drain Flows
Figure 16



Groundwater Interceptor Drain Flows
Figure 17

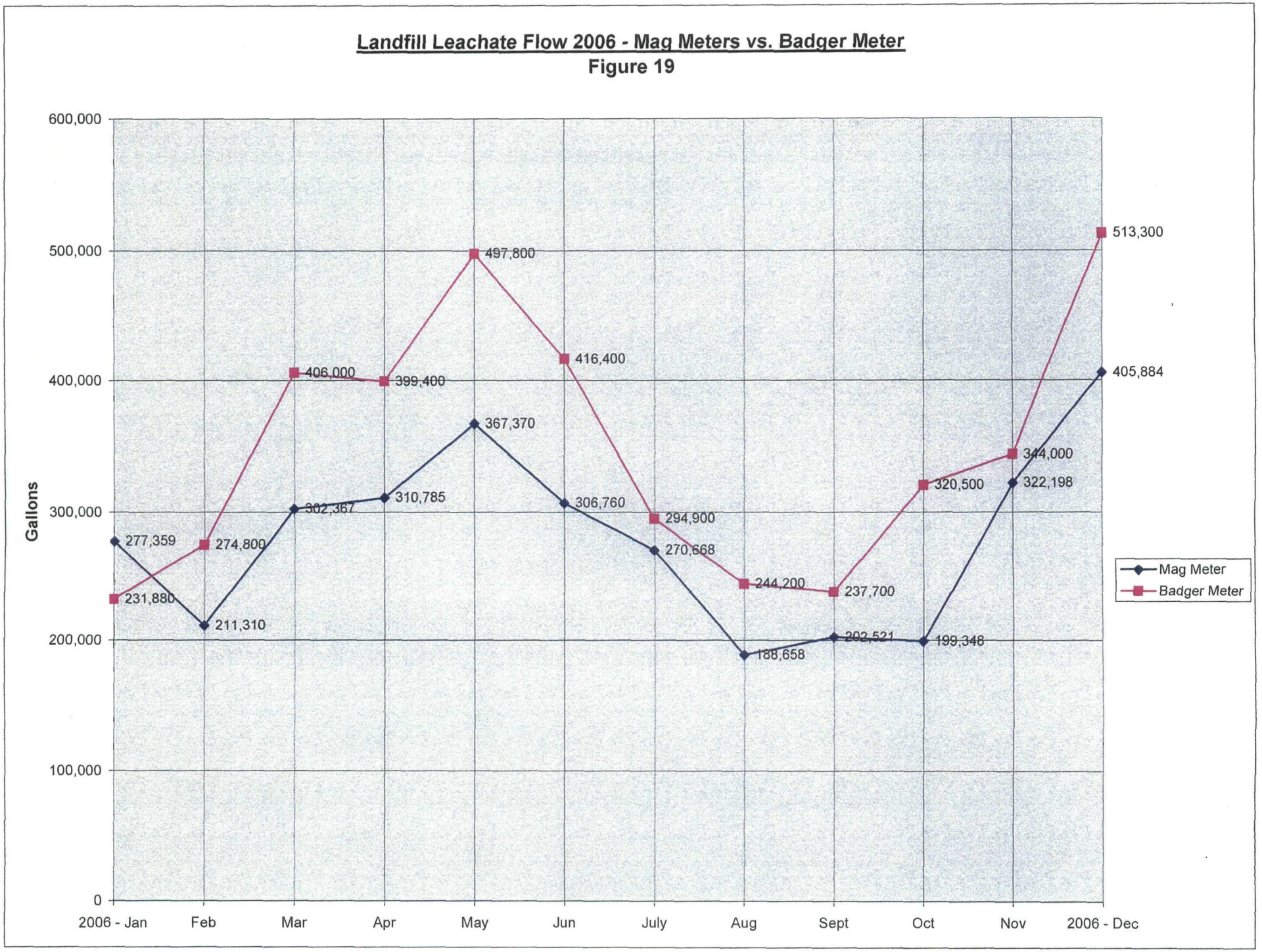


Leachate Collection Sumps - Historical Data
Figure 18

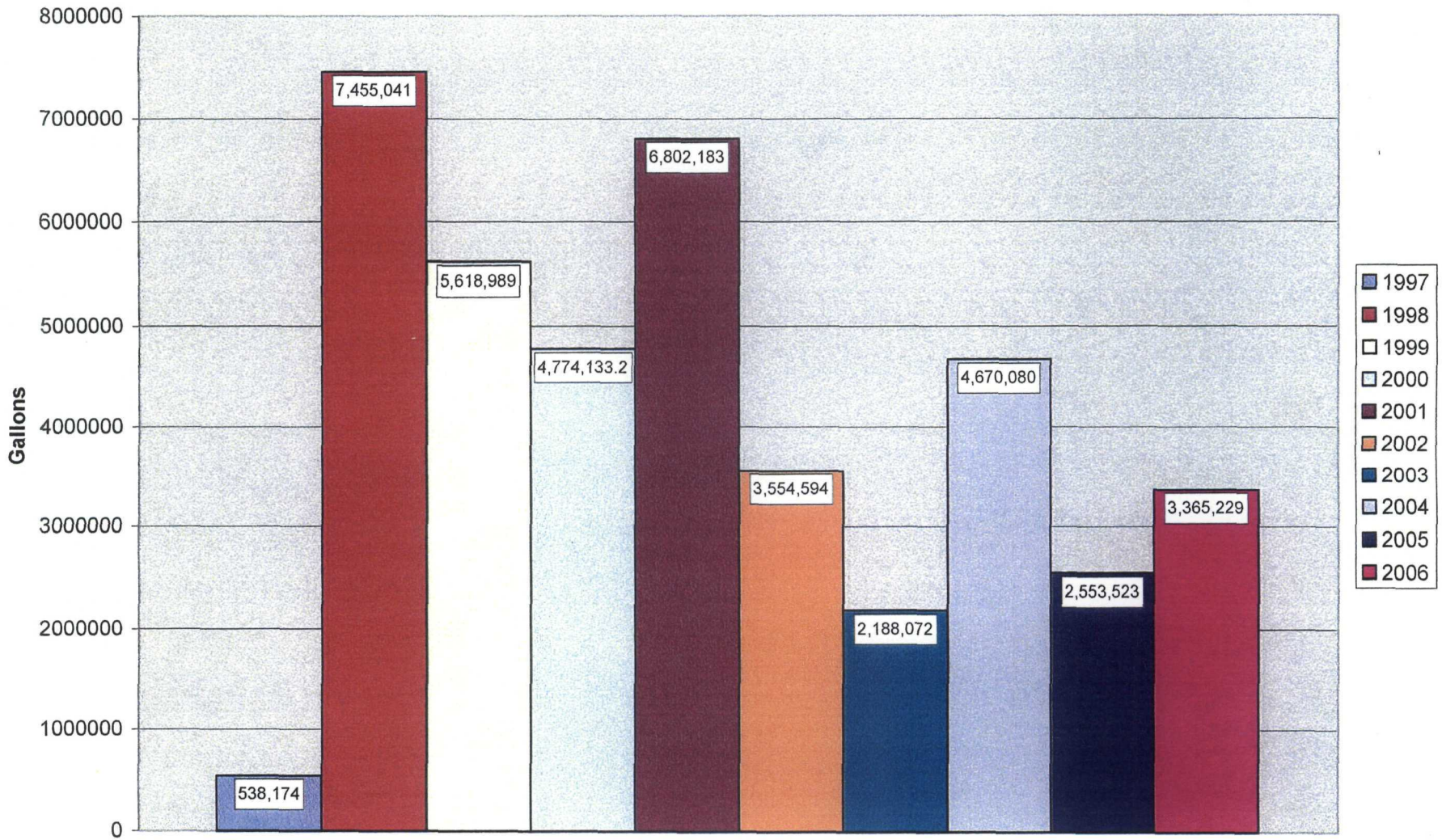


Landfill Leachate Flow 2006 - Mag Meters vs. Badger Meter

Figure 19



Annual Landfill Leachate Flows
Figure 20



Tables

Groundwater Interceptor Drain
2006 Flows

Table 1

	Sump No. 1	Sump No. 2	Sump No. 3	Sump No. 4	TOTAL
January	0	84,933	0	192,426	277,359
February	0	67,212	0	144,098	211,310
March	0	112,595	0	189,772	302,367
April	0	120,049	0	190,736	310,785
May	0	165,690	0	201,681	367,371
June	0	155,908	0	150,852	306,760
July	1,218	167,628	0	101,822	270,668
August	0	87,898	0	100,760	188,658
September	22	70,266	35,035	97,199	202,522
October	1	56,967	0	142,381	199,349
November	0	84,102	0	238,096	322,198
December	0	128,433	0	277,451	405,884
TOTAL	1,241	1,301,681	35,035	2,027,274	3,365,231

Table 2

Landfill Leachate Collection Analytical Report

2004 through 2006

Analyte	Units	1/13/2004	4/22/2004	7/21/2004	10/20/2004	1/11/2005	4/19/2005	7/13/2005	11/2/2005	1/6/2006	4/5/2006	7/13/2006	10/17/2006
Copper	mg/l	0.0224	0.0097	0.0054	0.0078	0.007	0.0072	0.0100	0.0098	0.0063	0.0081	0.0068	0.00951
Zinc	mg/l	0.0068	0.0126	0.0218	0.01103	0.0167	0.0825	0.023	0.0263	0.0066	0.0112	0.0142	0.0149
Aluminum	mg/l	0.0086	0.0479	0.0492	0.03866	0.0225	0.0352	0.0116	0.0256	0.0111	0.0109	0.0103	0.075
Molybdenum	mg/l	0.059	0.041	0.0287	0.05419	0.0485	0.0474	0.0402	0.04	0.0297	0.0281	0.03	0.0365
COD	mg/l	32.5	24.5	27.5	22.2	28.4	25.7	29.5	39.2	25.4	27.9	33	20.2
Hardness	mg/l	1034	836.4	1348	786.8	1040	724	1010	1116	646	762.9	1025.9	741
Chloride	mg/l	176.1	156.8	192.2	205.1	188.2	178.5	199.6	199.7	121.8	143.7	186.3	187.6
pH	s.u.	7.32	7.42	7.01	7.06	7.38	7.03	7.07	6.83	7.06	7.26	6.9	6.99
Benzene	ug/l	<0.60	<0.60	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.20	<0.20	<0.20
cis-1,2-Dichloroethene	ug/l	5.51	3.34	4.56	31.8	6.12	22.2	4.27	43.83	16.7	3.06	19.6	12.62
Methylene Chloride	ug/l	<0.65	<0.65	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<0.40	<0.40	<0.40
Trichloroethene	ug/l	<1.00	<1.00	1.36	0.61	<0.40	<0.40	<0.40	0.9	<0.40	<0.30	0.65	0.41
Vinyl Chloride	ug/l	<0.70	<0.70	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.45	<0.45	<0.45
1,1dichloroethane	ug/l	0.84	<0.50	0.66	6.4	0.92	4.09	<0.40	6.19	1.79	<0.40	3.04	1.15

Values Highlighted in Red = Below Detection Limits

Appendix A

CHEMICAL AND METALLURGICAL LABORATORY REPORT - KOHLER CO.

Report No.: 06010093
Date Issued: 1-10-06

REPORT TITLE: Analysis of 1st Quarter Twin Oaks Landfill Leachate Sample

OBJECTIVE/BACKGROUND

Determine the aluminum, copper, molybdenum, zinc, hardness, COD, chloride, pH, and VOC concentrations in a leachate sample collected at the Twin Oaks landfill on 1/04/06. This sampling is in fulfillment of the first quarter monitoring requirements.

EXPERIMENTAL PROCEDURE

The effluent sample was analyzed by following these C & M Laboratory Procedures:

713 – Chemical Oxygen Demand: Dichromate Reflux Titration
726a – pH of Aqueous Solutions
730 – Volatile Organic Compounds: GC/MS Purge and Trap Capillary Column Technique
721 – Chloride: Mecuric Nitrate Titration Method
722 - Hardness (Total and Calcium): EDTA Titration
752 - Determination of Trace Elements in Waters and Wastes by ICP-MS

Authors: John Multer, Joan Deno, Autumn Farrell, Heidi Stubbe **Reviewed by:** David Kluz

Distribution:

R. Pfarrer
R. Kraemer
File

RESULTS

Analysis of 1st Quarter Twin Oaks Landfill Leachate

Analyte	Units	Sample Analysis Date	Concentration
Aluminum	µg/L	01/06/06	11.1
Copper	µg/L	01/06/06	6.27
Molybdenum	µg/L	01/06/06	29.7
Zinc	µg/L	01/06/06	6.58
COD	mg/L	01/06/06	25.4
Hardness	mg/L $CaCO_3$	01/05/06	646
Chloride	mg/L	01/09/06	121.8
pH	SU	01/04/06	7.06
1,1-Dichloroethane	µg/L	01/09/06	1.79
Benzene	µg/L	01/09/06	<0.30
cis-1,2-Dichloroethene	µg/L	01/09/06	16.7
Methylene Chloride	µg/L	01/09/06	<1.05
Trichloroethene	µg/L	01/09/06	<0.40
Vinyl Chloride	µg/L	01/09/06	<0.60

KOHLER.

CHAIN OF CUSTODY RECORD

Chemical & Metallurgical Laboratory
444 Highland Drive, MS 205
Kohler, WI 53044
920/457-4441 Fax: 920/803-4882

Report To: R. Kraemer, H. Stubbe
Account Charged:
Report No.: See Below

Sampled By: H. Stubbe (Print name)
(Print name)

Requested By: H. Stubbe (Print name)
(Print name)

To assist us in selecting the proper method:
Is this work being conducted for regulatory compliance monitoring? X Yes ☐ No
Is this work being conducted for regulatory enforcement action? X Yes ☐ No
Which regulations apply:
☐ UST ☒ NPDES Wastewater ☐ Other
☐ RCRA ☐ Drinking Water ☐ None

Date	Time	Sample Description	# Container Type (P= Plastic G= Glass) Matrix	Grab	Comp	HCl	NaOH	HNO_3	H_2SO_4	Other	4oC	Preservation Verified	ANALYSES: Metals	Hard	COD	Chloride	pH	VOC	Comments
1/4/00	10:55	Landfill Leachate	W		P			X					X						AB9644 - 00010093
"	"	"	W		P				X					X	X				AB9643 - "
"	"	"	W		P						X					X			AB9640 - "
"	"	"	W	T							X						X		AB9644 - "
"	"	"	W	G							X							X	AB9642 - "

Condition of Sample: Bottles intact? X Yes ☐ No COC seals present and intact? ☐ Yes X No
Field filtered? ☐ Yes X No Volatiles free of headspace? ~~Yes~~ ~~No~~
Temperature upon receipt: On Ice

Sample Remainder Disposal: Return sample remainder to Kohler via ____
The Lab has permission to dispose of all sample remainders ____ Date: 1/4/00

Relinquished by:	Date	Time	Received for Lab by:
Heidi Stubbe	1/4/00	13:30	

Method of Shipment: Lab Van
Remarks:

C&M Lab: Note if any work is to be sub contracted
Outside Lab:
Sub-contracted Analyses:

White - Receiving Lab Yellow - C & M Laboratory Pink - Requestor

C & M Lab Report 06010093

CHEMICAL AND METALLURGICAL LABORATORY REPORT - KOHLER CO.

Report No.: 06030448
Date Issued: 4-18-06

REPORT TITLE: Analysis of 2nd Quarter Twin Oaks Landfill Leachate Sample

OBJECTIVE/BACKGROUND

Determine the aluminum, copper, molybdenum, zinc, COD, hardness, chloride, pH, and VOC concentrations in a leachate sample collected at the Twin Oaks landfill on 4/5/06. This sampling is in fulfillment of the second quarter monitoring requirements.

EXPERIMENTAL PROCEDURE

The effluent sample was analyzed by following these C & M Laboratory Procedures:

713 – Chemical Oxygen Demand: Dichromate Reflux Titration
726a – pH of Aqueous Solutions
730 – Volatile Organic Compounds: GC/MS Purge and Trap Capillary Column Technique
721 – Chloride: Mecuric Nitrate Titration Method
722 – Hardness (Total and Calcium): EDTA Titration
752 - Determination of Trace Elements in Waters and Wastes by ICP-MS

Authors: Lisa Escher, Joan Deno, Ron Stubbe, Heidi Stubbe

Reviewed by: David Kluz

Distribution:

R. Pfarrer
R. Kraemer
File

RESULTS

Analysis of 2nd Quarter Twin Oaks Landfill Leachate

Analyte	Units	Sample Analysis Date	Concentration
Aluminum	µg/L	4/13/06	10.9
Copper	µg/L	4/17/06	8.08
Molybdenum	µg/L	4/17/06	28.1
Zinc	µg/L	4/17/06	11.2
COD	mg/L	4/10/06	27.9
Hardness	mg/L $CaCO_3$	4/10/06	762.9
Chloride	mg/L	4/10/06	143.7
pH	SU	4/05/06	7.26
1,1-Dichloroethane	µg/L	4/13/06	<0.40
Benzene	µg/L	4/13/06	<0.20
cis-1,2-Dichloroethene	µg/L	4/13/06	3.06
Methylene Chloride	µg/L	4/13/06	<0.40
Trichloroethene	µg/L	4/13/06	<0.30
Vinyl Chloride	µg/L	4/13/06	<0.45

KOHLER.

CHAIN OF CUSTODY RECORD

Chemical & Metallurgical Laboratory
444 Highland Drive, MS 205
Kohler, WI 53044
920 457-4441 Fax: 920 803-4882

Report To: R. Kramer

Account Charged:

Report No.: See Below

Sampled By: H. Stoltz (Print name)

(Print name)

Requested By: R. Kramer (Print name)

(Print name)

To assist us in selecting the proper method:

Is this work being conducted for regulatory compliance monitoring? X Yes ☐ No

Is this work being conducted for regulatory enforcement action? X Yes ☐ No

Which regulations apply: ☐ UST X NPDES Wastewater ☐ Other ☐ RCRA ☐ Drinking Water ☐ None

Date	Time	Sample Description	Matrix	Grab	Comp	HCl	NaOH	HNO_3	H_2SO_4	Other	4°C	Preservation Verified	Metals	COD	Hardness	Ext pH	VOC	O-Cr	Cl	Comments
4/5/06	1145	2nd Cell Lagoon	W		P			X					X							AC04126 - 0603048
"	"	"	W	P					X					X						AC04127 - "
"	"	"	W					X							X					AC04128 - "
"	"	"	W	P	[illegible]						X					X			~~X~~	AC04129 - " ~~[illegible]~~
"	"	"	W	V		X											X			AC04130 - "
"	1200	2nd Dr. CWPE	W		P			X					X							AC04112 - 0603043
"	"	"	W	P							X					X				AC04113 - "
"	"	"	W						X									X		AC04114 - "
4/5/06	1130	2nd Dr. Land Treatment	W		P						X								X	AC04313 - 0603048

Condition of Sample: Bottles intact? X Yes ☐ No COC seals present and intact? ~~☐ Yes ☐ No~~

Field filtered? ☐ Yes X No Volatiles free of headspace? X Yes ☐ No

Temperature upon receipt: On Ice

Sample Remainder Disposal: Return sample remainder to Kohler via ____

The Lab has permission to dispose of all sample remainders ____

Date: 4/5/06

Relinquished by:	Date	Time	Received for Lab by:
H. Stoltz	4/5/06	3:00	Jean Deno

Method of Shipment: Lab Van

Remarks:

C&M Lab: Note if any work is to be sub contracted

Outside Lab: Subcontracted Analyses:

White - Receiving Lab Yellow - C & M Laboratory Pink - Requestor

CHEMICAL AND METALLURGICAL LABORATORY REPORT - KOHLER CO.

Report No.: 06070063
Date Issued: 7-21-06

REPORT TITLE: Analysis of 3rd Quarter Twin Oaks Landfill Leachate Sample

OBJECTIVE/BACKGROUND

Determine the aluminum, copper, molybdenum, zinc, COD, hardness, chloride, pH, and VOC concentrations in a leachate sample collected at the Twin Oaks landfill on 7/13/06. This sampling is in fulfillment of the third quarter monitoring requirements.

EXPERIMENTAL PROCEDURE

The effluent sample was analyzed by following these C & M Laboratory Procedures:

713 – Chemical Oxygen Demand: Dichromate Reflux Titration
726a – pH of Aqueous Solutions
730 – Volatile Organic Compounds: GC/MS Purge and Trap Capillary Column Technique
721 – Chloride: Mercuric Nitrate Titration Method
722 – Hardness (Total and Calcium): EDTA Titration
752 - Determination of Trace Elements in Waters and Wastes by ICP-MS

Authors: Lisa Escher, Joan Deno, Ron Stubbe, Heidi Stubbe

Reviewed by: Mary Jo Grabner

Distribution:

R. Pfarrer
R. Kraemer
File

RESULTS

Analysis of 3rd Quarter Twin Oaks Landfill Leachate

Analyte	Units	Sample Analysis Date	Concentration
Aluminum	µg/L	7/17/06	10.29
Copper	µg/L	7/17/06	6.76
Molybdenum	µg/L	7/17/06	30.0
Zinc	µg/L	7/17/06	14.2
COD	mg/L	7/14/06	33.0
Hardness	mg/L $CaCO_3$	7/17/06	1025.9
Chloride	mg/L	7/17/06	186.3
pH	SU	7/13/06	6.90
1,1-Dichloroethane	µg/L	7/18/06	3.04
Benzene	µg/L	7/18/06	<0.20
cis-1,2-Dichloroethene	µg/L	7/18/06	19.6
Methylene Chloride	µg/L	7/18/06	<0.40
Trichloroethene	µg/L	7/18/06	0.65
Vinyl Chloride	µg/L	7/18/06	<0.45

KOHLER.

CHAIN OF CUSTODY RECORD

Chemical & Metallurgical Laboratory
444 Highland Drive, MS 205
Kohler, WI 53044
920-457-4441 Fax: 920/803-4882

Report To: R. Kramer
Account Charged:
Report No.: See Below

Sampled By: A Stuta (Print name)
(Print name)

Requested By: R. Kramer (Print name)
(Print name)

To assist us in selecting the proper method:
Is this work being conducted for regulatory compliance monitoring? X Yes ☐ No
Is this work being conducted for regulatory enforcement action? X Yes ☐ No
Which regulations apply:
☐ UST X NPDES Wastewater ☐ Other
☐ RCRA ☐ Drinking Water ☐ None

Date	Time	Sample Description	Matrix	# Container Type (P= Plastic G= Glass) Grab	Comp	HCl	NaOH	HNO_3	H_2SO_4	Other	4oC	Preservation Verified	Alkalinity, Hardness	COD	Metals	pH	KJC	TSS	TP Nitrate	Comments
7/12/12	11:30	Landfill Outlet	W		P			X					X							AC12288 - 20072203
"	"	"	W		P				X					X						AC12289 - "
"	"	"	W		P						X				X					AC12290 - "
"	"	"	W	P							X					X				AC12291 - "
"	"	"	W	V		X											X			AC12292 - "
"	3:40	Cen. Culvert	W	P							X					X				AC12293 - 20072245
"	"	"	W	P					X										X	AC12294 - "
"	1:10	Kohler Log 2012	W	P							X					X		X		AC12194 - 20072044

Condition of Sample: Bottles intact? X Yes ☐ No COC seals present and intact? ☐ Yes ☐ No
Field filtered? ☐ Yes X No Volatiles free of headspace? X Yes ☐ No
Temperature upon receipt: _____

Sample Remainder Disposal: Return sample remainder to Kohler via _____
The Lab has permission to dispose of all sample remainders _____
Date: 7/13/12

Relinquished by:	Date	Time	Received for Lab by:
Heidi Stuth	7/13/12	1:30	Joan Duno

Method of Shipment	Remarks:
Lab Van	

C&M Lab: Note if any work is to be sub-contracted
Outside Lab: Sub-contracted Analyses:

White - Receiving Lab Yellow - C & M Laboratory Pink - Requestor

CHEMICAL AND METALLURGICAL LABORATORY REPORT - KOHLER CO.

Report No.: 06100173
Date Issued: 10-27-06

REPORT TITLE: Analysis of 4th Quarter Twin Oaks Landfill Leachate Sample

OBJECTIVE/BACKGROUND

Determine the aluminum, copper, molybdenum, zinc, COD, hardness, chloride, pH, and VOC concentrations in a leachate sample collected at the Twin Oaks landfill on 10/17/06. This sampling is in fulfillment of the fourth quarter monitoring requirements.

EXPERIMENTAL PROCEDURE

The effluent sample was analyzed by following these C & M Laboratory Procedures:

713 – Chemical Oxygen Demand: Dichromate Reflux Titration
726a – pH of Aqueous Solutions
730 – Volatile Organic Compounds: GC/MS Purge and Trap Capillary Column Technique
721 – Chloride: Mercuric Nitrate Titration Method
722 – Hardness (Total and Calcium): EDTA Titration
752 - Determination of Trace Elements in Waters and Wastes by ICP-MS

Authors: Lisa Escher, Joan Deno, Ron Stubbe, Heidi Stubbe

Reviewed by: Autumn Farrell

Distribution:

R. Pfarrer
R. Kraemer
File

RESULTS

Analysis of 4th Quarter Twin Oaks Landfill Leachate

Analyte	Units	Sample Analysis Date	Concentration
Aluminum	µg/L	10/19/06	75.0
Copper	µg/L	10/19/06	9.51
Molybdenum	µg/L	10/20/06	36.5
Zinc	µg/L	10/20/06	14.9
COD	mg/L	10/20/06	20.2
Hardness	mg/L $CaCO_3$	10/18/06	741.0
Chloride	mg/L	10/18/06	187.6
pH	SU	10/17/06	6.99
1,1-Dichloroethane	µg/L	10/25/06	1.15
Benzene	µg/L	10/25/06	<0.20
cis-1,2-Dichloroethene	µg/L	10/25/06	12.62
Methylene Chloride	µg/L	10/25/06	<0.40
Trichloroethene	µg/L	10/25/06	0.41
Vinyl Chloride	µg/L	10/25/06	<0.45

KOHLER®

CHAIN OF CUSTODY RECORD

Chemical & Metallurgical Laboratory
111 Highland Drive, MS 205
Kohler, WI 53044
920/457-4441 Fax: 920/803-4882

Report To: R. Kramer
Account Charged: —
Report No.: 06100173

Sampled By: H. Stibbe (Print name) / R. Stibbe (Print name)

Requested By: R. Kramer (Print name) / (Print name)

To assist us in selecting the proper method:
Is this work being conducted for regulatory compliance monitoring? X Yes ☐ No
Is this work being conducted for regulatory enforcement action? X Yes ☐ No
Which regulations apply:
☐ UST ☒ NPDES Wastewater ☐ Other
☐ RCRA ☐ Drinking Water ☐ None

Date	Time	Sample Description	Matrix	Grab	Comp	# Containers	NaOH	HNO3	H2SO4	Other	Ice	Metals	Hardness	COD	Chloride	pH	VOC	Comments
10/7/10	10:55	Inlet of infiltration pond	W		P	1		X				X						AC20967
"	"	"	W		P	1		X					X					AC20968
"	"	"	W	P		1			X					X				AC20969
"	"	"	W	P		1					X				X			AC20970
"	"	"	W	V		1	X										X	AC20971

Conditions of Sample: Bottles intact? X Yes ☐ No — COC seals present and intact? ☐ Yes ☐ No
Field filtered? ☐ Yes X No — Volatiles free of headspace? X Yes ☐ No
Temperature upon receipt: On Ice.

Sample Remainder Disposal: Return sample remainder to Kohler via ___
The Lab has permission to dispose of all sample remainders ___

Relinquished by:	Date	Time	Received for Lab by:
Heidi Stibbe	10/7/10	11:25	

Method of Shipment: Lab Van
Remarks:

C&M Lab: Note if any work is to be sub contracted
Outside Lab
Sub-contracted Analyses:

White - Receiving Lab Yellow - C & M Laboratory Pink - Requestor

SDMS US EPA Region V

Imagery Insert Form

Some images in this document may be illegible or unavailable in SDMS.
Please see reason(s) indicated below:

☐ Illegible due to bad source documents. Image(s) in SDMS is equivalent to hard copy.

Specify Type of Document(s) / Comments:

☐ Includes ___ COLOR or RESOLUTION variations.
Unless otherwise noted, these pages are available in monochrome. The source document page(s) is more legible than the images. The original document is available for viewing at the Superfund Records Center.

Specify Type of Document(s) / Comments:

☐ Confidential Business Information (CBI).
This document contains highly sensitive information. Due to confidentiality, materials with such information are not available in SDMS. You may contact the EPA Superfund Records Manager if you wish to view this document.

Specify Type of Document(s) / Comments:

☒ Unscannable Material:
Oversized __x__ or ____ Format.
Due to certain scanning equipment capability limitations, the document page(s) is not available in SDMS. .

Specify Type of Document(s) / Comments:

Appendix B & C – drawings of 2005 & 2006 Construction Report

☐ Document is available at the EPA Region 5 Records Center.

Specify Type of Document(s) / Comments:

ATTACHMENT 4 - **Site Inspection Checklist**

OSWER No. 9355.7-03B-P

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable")

I. SITE INFORMATION

Site name: KOHLER CO LANDFILL	Date of inspection: 5-23-07
Location and Region: SHEBOYGAN CO Region 5	EPA ID: WI000607325
Agency, office, or company leading the five-year review: WISC. DNR	Weather/temperature: Cool + overcast

Remedy Includes: (Check all that apply)

- [X] Landfill cover/containment
- [X] Access controls
- [X] Institutional controls
- [ ] Groundwater pump and treatment
- [ ] Surface water collection and treatment
- [ ] Other _____
- [X] Monitored natural attenuation
- [X] Groundwater containment
- [ ] Vertical barrier walls

Attachments: [ ] Inspection team roster attached [ ] Site map attached

II. INTERVIEWS (Check all that apply)

1. O&M site manager DICK PEARCE (Name) SITE ENGINEER (Title) 5-23-07 (Date)
   Interviewed [ ] at site [ ] at office [ ] by phone Phone no. 920-457-4441
   Problems, suggestions; [ ] Report attached No Problems

2. O&M staff KARL ZORE (Name) FOREMAN (Title) 5-23-07 (Date)
   Interviewed [ ] at site [ ] at office [ ] by phone Phone no. 920-457-4444
   Problems, suggestions; [ ] Report attached No problems

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

4. **Other interviews (optional)** G Report attached.

OSWER No. 9355.7-03B-P

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1.	**O&M Documents**			
	G O&M manual	(G) Readily available	G Up to date	G N/A
	G As-built drawings	(G) Readily available	G Up to date	G N/A
	G Maintenance logs	(G) Readily available	G Up to date	G N/A
	Remarks			
2.	**Site-Specific Health and Safety Plan**	(G) Readily available	G Up to date	G N/A
	G Contingency plan/emergency response plan	G Readily available	G Up to date	G N/A
	Remarks			
3.	**O&M and OSHA Training Records**	(G) Readily available	G Up to date	G N/A
	Remarks			
4.	**Permits and Service Agreements**			
	G Air discharge permit	G Readily available	G Up to date	G N/A
	G Effluent discharge	G Readily available	G Up to date	G N/A
	(G) Waste disposal, POTW	(G) Readily available	G Up to date	G N/A
	G Other permits	G Readily available	G Up to date	G N/A
	Remarks			
5.	**Gas Generation Records**	G Readily available	G Up to date	G N/A
	Remarks N/A			
6.	**Settlement Monument Records**	G Readily available	G Up to date	G N/A
	Remarks Annual Survey is performed			
7.	**Groundwater Monitoring Records**	(G) Readily available	G Up to date	G N/A
	Remarks			
8.	**Leachate Extraction Records**	(G) Readily available	G Up to date	G N/A
	Remarks			
9.	**Discharge Compliance Records**			
	G Air	G Readily available	G Up to date	G N/A
	(G) Water (effluent)	G Readily available	G Up to date	G N/A
	Remarks			
10.	**Daily Access/Security Logs**	(G) Readily available	G Up to date	G N/A
	Remarks			

IV. O&M COSTS

1. **O&M Organization**
   - G State in-house
   - G PRP in-house
   - G Federal Facility in-house
   - G Other
   - G Contractor for State
   - G Contractor for PRP
   - G Contractor for Federal Facility

2. ***O&M Cost Records*** Two Budgets Real time Monitoring Site topping lac every other year
   - G Readily available
   - C Up to date
   - G Funding mechanism/agreement in place
   - Original O&M cost estimate _____ G Breakdown attached

   Total annual cost by year for review period if available

   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: None

V. ACCESS AND INSTITUTIONAL CONTROLS G Applicable G N/A

A. Fencing

1. **Fencing damaged** G Location shown on site map G Gates secured G N/A
   Remarks N/A

B. Other Access Restrictions

1. **Signs and other security measures** G Location shown on site map G N/A
   Remarks Site is patrolled by Co security operators in radio contact
   Bar code reader for access locked gate

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented G Yes G No G N/A
Site conditions imply ICs not being fully enforced G Yes G No G N/A

Type of monitoring (*e.g., self-reporting, drive by*) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date G Yes G No G N/A
Reports are verified by the lead agency G Yes G No G N/A

Specific requirements in deed or decision documents have been met G Yes G No G N/A
Violations have been reported G Yes G No G N/A
Other problems or suggestions: G Report attached

2. **Adequacy** G ICs are adequate G ICs are inadequate G N/A
Remarks _____

D. General

1. **Vandalism/trespassing** G Location shown on site map G No vandalism evident
Remarks None

2. **Land use changes on site** G N/A
Remarks None

3. **Land use changes off site** G N/A
Remarks None

VI. GENERAL SITE CONDITIONS

A. Roads G Applicable G N/A

1. **Roads damaged** G Location shown on site map G Roads adequate G N/A
Remarks Good shape

B. Other Site Conditions

Remarks NR 500 Cap 2' clay
30" soil beyond
6" top soil

VII. LANDFILL COVERS G Applicable G N/A

A. Landfill Surface

1. **Settlement** (Low spots) G Location shown on site map (G) Settlement not evident
Areal extent_____ Depth_____
Remarks_____

2 **Cracks** G Location shown on site map (G) Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____

3. **Erosion** G Location shown on site map (G) Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Holes** G Location shown on site map (G) Holes not evident
Areal extent_____ Depth_____
Remarks_____

5. **Vegetative Cover** G Grass G Cover properly established G No signs of stress
G Trees/Shrubs (indicate size and locations on a diagram)
Remarks DOT Road mix

6. **Alternative Cover** (armored rock, concrete, etc.) (G) N/A
Remarks_____

7. **Bulges** G Location shown on site map (G) Bulges not evident
Areal extent_____ Height_____
Remarks_____

OSWER No. 9355.7-03B-P

8. **Wet Areas/Water Damage** G Wet areas/water damage not evident
- (G) Wet areas — G Location shown on site map — Areal extent
- G Ponding — G Location shown on site map — Areal extent
- G Seeps — G Location shown on site map — Areal extent
- G Soft subgrade — G Location shown on site map — Areal extent

Remarks: Leachate from landfill in 1950 Cobles SO brown substance at

9. **Slope Instability** G Slides G Location shown on site map (G) No evidence of slope instability
Areal extent
Remarks

B. Benches G Applicable (G) N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** G Location shown on site map (G) N/A or okay
Remarks

2. **Bench Breached** G Location shown on site map (G) N/A or okay
Remarks

3. **Bench Overtopped** G Location shown on site map (G) N/A or okay
Remarks

C. Letdown Channels (G) Applicable G N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** G Location shown on site map (G) No evidence of settlement
Areal extent Depth
Remarks

2. **Material Degradation** G Location shown on site map (G) No evidence of degradation
Material type Areal extent
Remarks

3. **Erosion** G Location shown on site map (G) No evidence of erosion
Areal extent Depth
Remarks

4. **Undercutting** G Location shown on site map (G) No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ (G) No obstructions
G Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
(G) No evidence of excessive growth
G Vegetation in channels does not obstruct flow
G Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations G Applicable (G) N/A

1. **Gas Vents** G Active G Passive
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance
G N/A
Remarks_____

2. **Gas Monitoring Probes**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
(G) Properly secured/locked G Functioning (G) Routinely sampled (G) Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

4. **Leachate Extraction Wells**
(G) Properly secured/locked G Functioning (G) Routinely sampled (G) Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

5. **Settlement Monuments** G Located G Routinely surveyed (G) N/A
Remarks_____

E. Gas Collection and Treatment G Applicable (G) N/A

1. **Gas Treatment Facilities**
   G Flaring G Thermal destruction G Collection for reuse
   G Good condition G Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   G Good condition G Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   G Good condition G Needs Maintenance G N/A
   Remarks_____

F. Cover Drainage Layer (G) Applicable G N/A

1. **Outlet Pipes Inspected** G Functioning (G) N/A
   Remarks_____

2. **Outlet Rock Inspected** G Functioning (G) N/A
   Remarks_____

G. Detention/Sedimentation Ponds G Applicable (G) N/A

1. **Siltation** Areal extent_____ Depth_____ G N/A
   G Siltation not evident
   Remarks_____

2. **Erosion** Areal extent _____ Depth_____
   G Erosion not evident
   Remarks_____

3. **Outlet Works** G Functioning G N/A
   Remarks_____

4. **Dam** G Functioning G N/A
   Remarks_____

OSWER No. 9355.7-03B-P

H. Retaining Walls G Applicable (G N/A)

1. **Deformations** G Location shown on site map G Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** G Location shown on site map G Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge (G Applicable) G N/A

1. **Siltation** G Location shown on site map (G Siltation not evident)
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** G Location shown on site map G N/A
   (G Vegetation does not impede flow)
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** G Location shown on site map (G Erosion not evident)
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** G Functioning (G N/A)
   Remarks_____

VIII. VERTICAL BARRIER WALLS G Applicable (G N/A)

1. **Settlement** G Location shown on site map G Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   G Performance not monitored
   Frequency_____ G Evidence of breaching
   Head differential_____
   Remarks_____

OSWER No. 9355.7-03B-P

IX. GROUNDWATER/SURFACE WATER REMEDIES G Applicable G N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines (G) Applicable G N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   (G) Good condition (G) All required wells properly operating G Needs Maintenance G N/A
   Remarks

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   (G) Good condition G Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   (G) Readily available (G) Good condition G Requires upgrade G Needs to be provided
   Remarks

B. Surface Water Collection Structures, Pumps, and Pipelines G Applicable (G) N/A

1. **Collection Structures, Pumps, and Electrical**
   G Good condition G Needs Maintenance
   Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   G Good condition G Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   G Readily available G Good condition G Requires upgrade G Needs to be provided
   Remarks

C. Treatment System G Applicable (G) N/A

1. **Treatment Train** (Check components that apply)
   G Metals removal G Oil/water separation G Bioremediation
   G Air stripping G Carbon adsorbers
   G Filters_____
   G Additive (*e.g.*, chelation agent, flocculent)_____
   G Others_____
   G Good condition G Needs Maintenance
   G Sampling ports properly marked and functional
   G Sampling/maintenance log displayed and up to date
   G Equipment properly identified
   G Quantity of groundwater treated annually_____
   G Quantity of surface water treated annually_____
   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   G N/A G Good condition G Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   G N/A G Good condition G Proper secondary containment G Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   G N/A G Good condition G Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   G N/A G Good condition (esp. roof and doorways) G Needs repair
   G Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   G Properly secured/lockedG Functioning G Routinely sampled G Good condition
   G All required wells located G Needs Maintenance G N/A
   Remarks_____

D. Monitoring Data

1. Monitoring Data
   (G) routinely submitted on time (G) is of acceptable quality

2. Monitoring data suggests:
   (G) Groundwater plume is effectively contained (G) Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   (G) Properly secured/locked (G) Functioning (G) Routinely sampled (G) Good condition
   (G) All required wells located G Needs Maintenance G N/A
   Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Remedy is effective and protective

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O+M is adequate

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

No problems

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

ATTACHMENT 5 - **Photos**

Landfill Entrance Road

Soil Stockpile Entrance Road

Figure 21
December 2006 Photo Documentation

Drainage Swale & Phase I Final Cover

Interceptor Drain Cleanouts

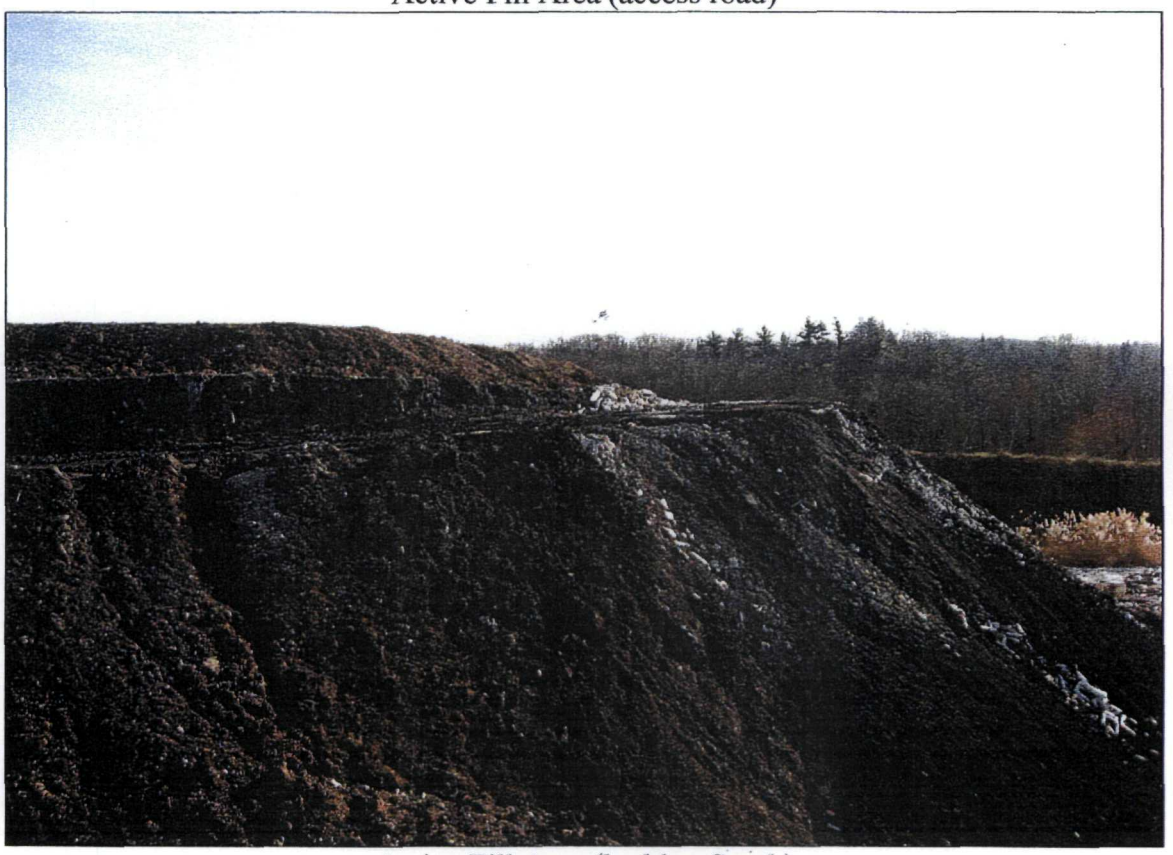
Figure 21
December 2006 Photo Documentation

Groundwater Monitoring Wells

Interceptor Drain Controls

Figure 21
December 2006 Photo Documentation

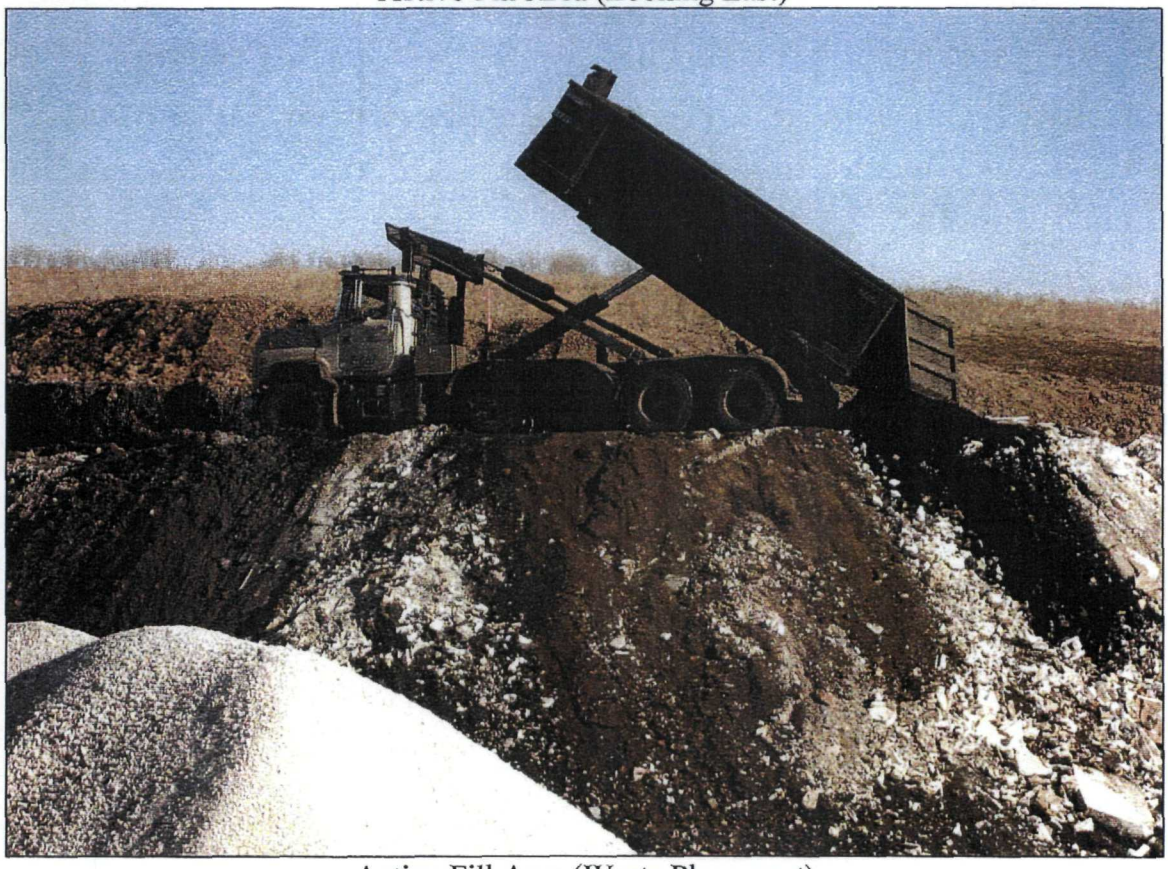
Active Fill Area (access road)



Active Fill Area (looking South)

Figure 21
December 2006 Photo Documentation

Active Fill Area (Looking East)



Active Fill Area (Waste Placement)

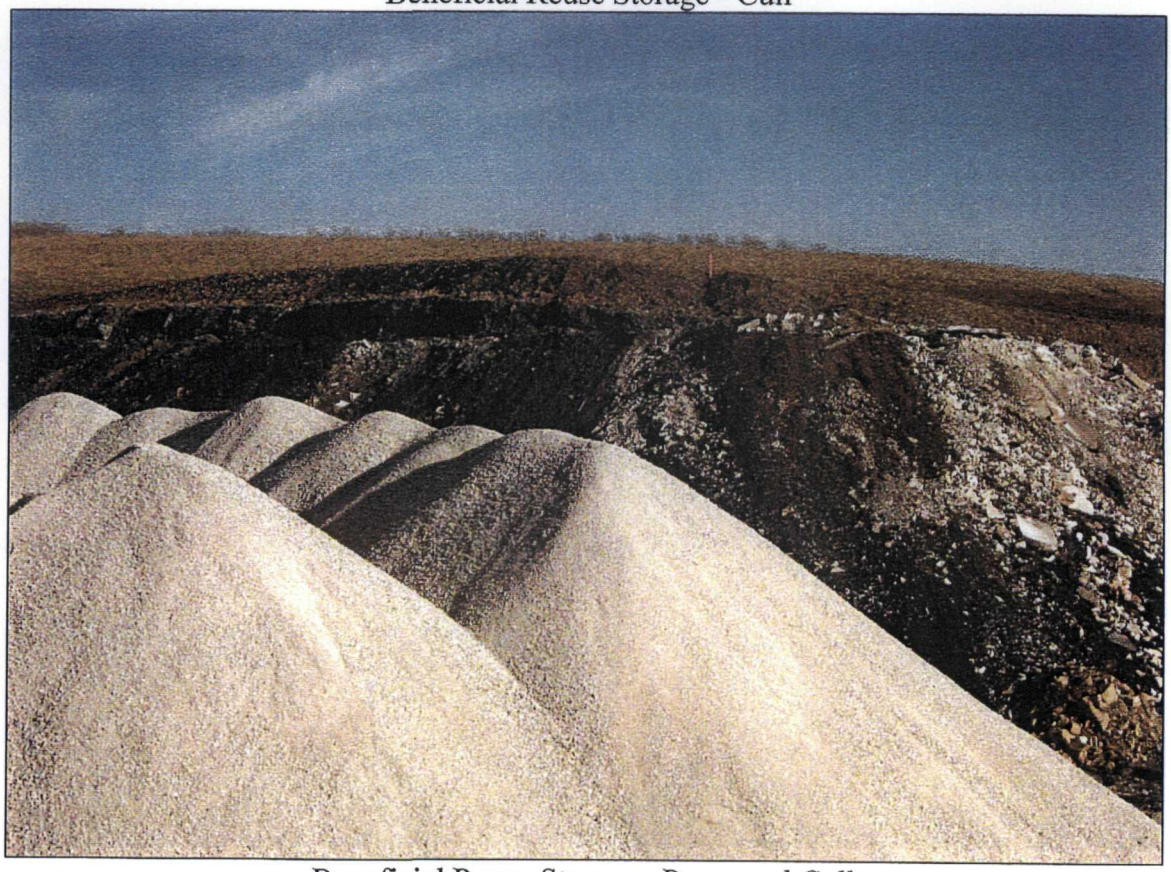
Figure 21
December 2006 Photo Documentation

Beneficial Reuse Storage – Access Road

Beneficial Reuse Storage – Access Road

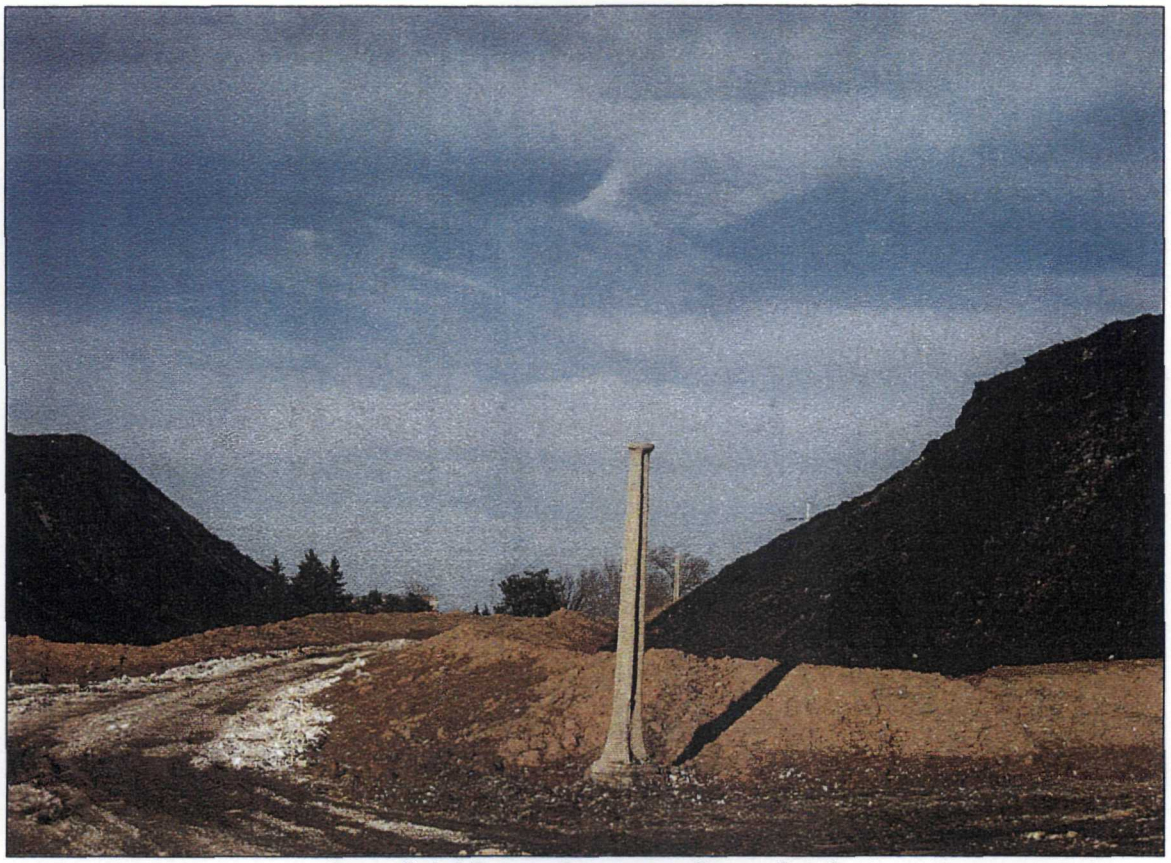
Figure 21
December 2006 Photo Documentation

Beneficial Reuse Storage - Cull



Beneficial Reuse Storage - Processed Cull

Figure 21
December 2006 Photo Documentation



Beneficial Reuse Storage – Green Sand

Beneficial Reuse Storage - Pepset

Figure 21
December 2006 Photo Documentation

Phase I Final Cover (Eastern Slope)

Phase I Final Cover (Northern Slope)

Figure 21
December 2006 Photo Documentation

Phase III Final Cover, Area A

Phase III Final Cover, Area A

Figure 21
December 2006 Photo Documentation

ATTACHMENT 6 - **Kohler Landfill License and Plans**

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
SOLID WASTE FACILITY OPERATION LICENSE

AUTHORIZED CONTACT

RICHARD PFARRER ENGINEER
KOHLER COMPANY
444 HIGHLAND DRIVE
KOHLER, WI 53044

LICENSE NO: 1508
TYPE OF FACILITY: Landfill > 500,000 Cu Yd - Monofill
EFFECTIVE DATE: October 1, 2006
DATE OF EXPIRATION: September 30, 2007

LICENSEE: KOHLER COMPANY

NAME OF FACILITY: KOHLER CO LF

LOCATION OF FACILITY: NE 1/4 OF SE 1/4 OF SECTION 29, T15, R23E
CTY HWY PP KOHLER, VILLAGE OF
SHEBOYGAN COUNTY, STATE OF WISCONSIN

This license authorizes the licensee to operate the solid waste facility described above during the term hereof except as modified by the Department. This license is subject to and conditioned upon compliance with the provisions of chapter 289, Wis. Stats. and chapters NR 500-590, Wis. Adm. Code, any plan approval and modifications thereof, and any special order and modifications thereof issued by the Department. Any exemptions from the requirements of chapters NR 500-590, Wis. Adm. Code, issued for the facility are listed above.

ERR/SF

WISCONSIN
DEPT. OF NATURAL RESOURCES
George E. Meyer
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
Box 7921
Madison, Wisconsin 53707
DNR TELEPHONE 608-266-2621
DNR TELEFAX 608-267-3579
DNR TDD 608-267-6897
SOLID WASTE MGMT 608-266-2111
SOLID WASTE TELEFAX 608-267-2768

AUG 2 9 1995

FID #: 460015380
Sheboygan County
SW & ERF - CORR

Mr. Richard A. Pfarrer, III
Kohler Company
Kohler, WI 53044

SUBJECT: Plan Modification for the Kohler Company Landfill; License No. 1508

Dear Mr. Pfarrer:

We have completed our review of the plan modification for the source control remediation design for the Kohler Company landfill. Based upon our review, we have determined that the plan modification is consistent with Wisconsin's solid waste regulations. If implemented in accordance with the approved plans, previous approvals, and this approval, the plan modification will be compatible with environmentally acceptable construction, operation, and monitoring of the facility. Therefore, the plan modification is approved, subject to compliance with chs. NR 500 to 520, Wis. Adm. Code, and the conditions of this approval. This approval should be maintained with the operating record for this facility.

The plan modification was proposed to implement remedial actions required by the record of decision for the Source Control Operable Unit (the landfill) issued by USEPA on March 30, 1992. Lead review and approval of the design and construction of the remedial actions for the landfill were delegated to the Department. The proposed remedial actions consist of construction of a multilayered final cover system, construction of a toe drain on the east side of the landfill, and construction of surface and subsurface drainage features of the final cover.

A draft of this approval was prepared and issued on January 30, 1995, with a 30 day comment period. Kohler Company requested an additional time to submit comments. Kohler Company submitted a comment letter dated on March 30, 1995. The comment document is treated an addendum to the plan modification, as is the documentation for the stockpiled clay soils report, dated June 6, 1995. These documents provided some of the details which the draft approval required by approval condition. A conference call between representatives of Kohler Company, Geraghty & Miller, and the Department on August 1, 1995, provided additional information and explanation for the comments on the draft approval. The draft conditions were modified to the extent that we found the proposed changes to be acceptable.

Certain items are not approved for construction as proposed. The leachate toe drain and sedimentation basin on the east side of the landfill will have to be amended by revised plans for the drain to be effective and to eliminate unacceptable effects caused by construction and operation of the sedimentation pond. The Department expects the toe drain to be designed so that it is installed at least several feet below the water table, to assure that leachate seeps will flow to a collection point rather than simply being redistributed by the drain, as would be the case with the proposed toe drain system.

The amended plans for the plan modification are required to be submitted within 90 days of the date of this approval. This should allow enough time to construct several of the features that have to be completed before final cover construction. The toe drain needs to be installed in late 1995 to allow time for it to stabilize the east sideslope, to develop a firm surface for removal and placement of cover soils during the 1996 construction season.

The proposed method of testing clay capping soils by use of a test pad can be used as an adjunct to the testing required under ch. NR 516. Kohler proposed informally last fall that it be allowed to use the clay soils it had stockpiled from local construction excavations without approval for construction of the capping layer. Kohler also wanted to continue to use soils from construction excavations for additional clay volumes.

A set of draft guidelines were provided to Kohler at the November 14, 1995, site inspection and meeting for the documentation of the clay soils already stockpiled at the landfill and for documenting future construction excavations. A finalized copy of those guidelines is attached to this approval. Kohler provided formal documentation dated April 26, 1995, for the stockpiled clay soils, which is treated as an addendum to the plan modification.

Kohler did not include a request for an alternative geotechnical investigation for documentation of the remaining volumes of clay soils it will need to close the landfill. This approval requires that Kohler propose a specific clay borrow site following the requirements of s. NR 512.18 or request an exemption under s. NR 500.08(4) for an alternative geotechnical investigation program.

During the conference call on August 1, 1995, we were told that Kohler was planning for the solidification or stabilization of wastes that are currently disposed of as a slurry or sludge. Kohler noted that the startup of solidification measures will begin by the middle of next year. Some measures have apparently been taken to reduce the volume of liquids disposed of in the landfill. No specific documentation of quantities were provided, but we agree that is an essential action.

This approval allows continued disposal of slurry wastes until the middle of next year, based upon Kohler's estimates of the time needed to order and install equipment. We want to emphasize that eliminating all free liquids that enter the landfill with the slurried wastes is an essential action to control surface seeps near the toe of the east sideslope. This is necessary to prepare the sideslope surfaces for the traffic and compaction activity needed to place an effective final cover.

Capturing the contaminated leachate was one of the corrective measures selected in the U.S.EPA's Record of Decision for the source control operable unit to reduce groundwater contamination caused by disposal of the foundry wastes. We wish to emphasize that the revised design will have to effectively capture leachate and direct it to one or more collection points where it will be removed for treatment after the toe drain is installed. Construction of the toe drain and other measures in 1995 are necessary to allow final cover construction next year.

Kohler enquired about continued use of the unfilled portion of the landfill. There is no restriction on use of the licensed landfill area that has not been filled with solid wastes, as long as land uses do not interfere with groundwater monitoring wells, drainage of surface water, surface care of soil and vegetation, and other operation and maintenance actions. We do not see any need to alter the license. Any activities on the waste-filled area will have to be limited to those which do not penetrate or otherwise compromise the final cover or lead to erosion, damage to monitoring wells, or interference with or damage to the remedial actions for leachate, gas, and groundwater.

The Kohler Company landfill is an unapproved facility in terms of the statutes governing regulation of solid waste facilities (s. 144.43 to 144.47, Stats.). There is no defined long-term care period for this landfill, and responsibility for its care is perpetual. Long-term care activities will include all routine activities associated with monitoring, surface care, drainage, access control, and reporting to the Department, as well as repairs due to any unanticipated actions. Additional responsibilities will be defined after decisions are made concerning groundwater remediation activities.

This approval establishes monitoring requirements for all groundwater monitoring wells, including wells installed as part of the Superfund investigation and two new well nests. This monitoring program will constitute the routine groundwater monitoring program for this site and should be implemented with the next sampling period.

In response to Kohler's March 30, 1995 letter providing comments on the draft Plan Modification, several of the ground water monitoring conditions have been changed. The number of ground water monitoring wells to be abandoned under Condition #21 of the approval has been expanded. All of the wells listed on page 14 of Kohler's response letter are included for abandonment <u>with the exception</u> of well #13A (DNR #262). Kohler justified abandoning this well because well 13A was redundantly located and screened across several units. However, a check of our records show that well 13A is shallow (12.5 feet deep), has a short screen (2 feet long) and is one of the few wells screened solely in the alluvium section of the shallow aquifer. Therefore the well has been retained and added to the monitoring program.

The plan modification retains the requirement that internal well nests 5 and 11 be replaced with new wells located just outside of the waste fill limits. These replacement wells are needed because, with the loss of wells 5, 5D, 11, 11D and OW2, there would be no monitoring wells along the western margin of the landfill near where the Old Waste Pit was located. The shallow ground water maps also indicate some radial ground water flow in the direction of the

western edge of the facility, although much of it was inferred because of a lack of monitoring points.

In response to Kohler's comments, sampling of the monitoring wells for PCB compounds has been dropped. We agree that it is unlikely that measurable PCB concentrations would be detected in filtered ground water samples. However, quarterly monitoring of most monitoring wells for a limited number of parameters has been retained despite Kohler's suggestion that the monitoring be done semi-annually. Quarterly monitoring is justified at this site for several reasons. The site is currently open and active and, as of this date, no remedial measures have been completed. The site is unlined and some ground water parameters in several wells indicate that contaminant levels are increasing. Also, ground water monitoring at this site has, historically, been sporadic and a more comprehensive data base must be generated to gauge the effectiveness of any remedial actions and establish long-term trends. Kohler may request reduced ground water monitoring from the Department after remedial actions have been completed at the landfill.

If you have any questions, you can call Robert Grefe at (608) 266-2178 or Philip Fauble at (608) 267-3538.

Sincerely,

Lakshmi Sridharan

Lakshmi Sridharan, Ph.D., P.E., Chief
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

cc. Roger Klett - SED
Kathleen Duchac - Geraghty & Miller, Milwaukee
Larry Hosmer - Geraghty & Miller, Annapolis, MD
Steve Padovani - USEPA, Region V, Superfund Program
Jane Lemcke - SW/3
Jack Connelly - SW/3
Ron Kazmierczak/Frank Schultz - SED

BEFORE THE
STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

CONDITIONAL ENGINEERING PLAN
APPROVAL MODIFICATION
FOR THE
KOHLER COMPANY LANDFILL
(LICENSE NO. 1508)

FINDINGS OF FACT

The Department finds that:

1. Kohler Company owns and operates an industrial solid waste landfill facility located in the NE¼ of the SE¼ of Section 29, T15N, R23E, in the Village of Kohler, Sheboygan County.

2. The Department issued an initial solid waste landfill license in 1969 and a conditional approval for plans and specifications on August 30, 1976.

3. On December 22, 1992, Kohler Company, through its engineering consultant, Geraghty & Miller, submitted a request to the Department for modifications to the conditional approval for plans and specifications. The proposed modifications include a revised final cover structure, reduced filling volume and site life, collection systems for surface and subsurface drainage, and proposed construction specifications and was amended by two addenda received on March 30, 1995, and April 27, 1995. The plan review fee of $1,500 was received on January 25, 1993.

4. The information submitted in connection with the plan modification request includes the following:

   a. A report entitled "Plan of Operation Modification Source Control Remedial Design", with plan sheets 1 to 17, prepared by Geraghty & Miller, and submitted under cover letter dated December 15, 1992.

   b. A report entitled "Comments on the Proposed Plan Modification, Kohler Company Landfill", prepared by Geraghty & Miller, and submitted under cover letter dated March 30, 1995.

   c. A report entitled "Alternative Geotechnical Investigation Program Addendum to March 30, 1995, Plan Modification Comments Kohler Company Landfill", prepared by Geraghty & Miller, and submitted under cover letter dated April 26, 1995.

   d. A letter entitled "Identification of Responsible Engineer for the Report Submitted to Wisconsin Department of Natural Resources (WDNR) Entitled "Alternative Geotechnical Investigation Program Addendum to March 30, 1995, Plan Modification Comments Kohler Company Landfill", prepared by Geraghty & Miller, and submitted under cover letter dated June 6, 1995.

5. Additional documents considered in connection with the review of the plan modification request include the following:

   a. An engineering plan dated May, 1976, prepared by Kohler Company in response to Department Order #2A-75-928, and the Department conditional approval dated August 30, 1976.

   b. A Department memo dated February 10, 1993, by Lynn Torgerson, Water Regulation & Zoning, to Roger Klett, Solid Waste Investigator, both of the Department's Southeast District, concerning the effect of site construction on the floodplain of the Sheboygan River.

   c. A Record of Decision for the source control operable unit, issued by the U.S. Environmental Protection Agency, dated March 30, 1992.

   d. A Department letter dated August 15, 1993, providing preliminary review of the final design of the submitted plan modification and requesting revisions or explanations, and the response letter dated November 22, 1993 prepared by Geraghty & Miller.

   e. A letter by Kohler Company dated August 25, 1994, and attached soils data for clayey soils stockpiled at the Kohler Company landfill.

   f. The Department's draft approval, under cover letter dated January 30, 1995, for the report entitled "Plan of Operation Modification (Source Control Remedial Design", issued for a 30 day comment period (subsequently extended to 60 days at Kohler Company request).

6. Additional facts relevant to the review of the plan modification request include the following:

   a. The landfill is owned by Kohler Company for the disposal of wastes generated by industrial activities, was used for waste disposal since the early 1950's, has been operated continuously by Kohler Company since then, and was not constructed with a liner and leachate collection system to prevent contamination of groundwater or surface water.

   b. Waste filling has occurred on 53 acres of the 82 acres of licensed landfill area, Kohler has confined filling operations to the middle of the waste-filled area, and the waste-filled area outside of the active filling and stockpile areas has been covered with interim cover of vegetated soil.

   c. Kohler Company has retained responsibility for conducting closure of the landfill, including construction of a multilayered final cover and an active gas extraction system.

d. The landfill receives industrial solid wastes from an iron foundry, brass foundry, pottery casting facility, slurries of pollution control dusts and waste clay, and miscellaneous sources of other wastes from the Kohler Company facilities, including air pollution control dusts, demolition wastes, and primary wastewater treatment sludge. For several years at the beginning of site operation, liquid wastes that contained solvents and certain hazardous wastes were disposed of in the landfill, as well as limited amounts of dredged material and municipal solid wastes generated by the Village of Kohler.

e. The landfill has caused groundwater contamination due to indicator substances, regulated metallic elements, and volatile organic chemicals due to past use of burn pits and liquids disposal pits and the continuing disposal of foundry and pottery facility wastes. Landfill operations have also resulted in seeps on the south and southeast sideslopes, which release leachate in surface flows from the toe and lower slopes.

f. Kohler Company is the SUPERFUND potentially responsible party for the landfill, the landfill has been subject to an investigation under the SUPERFUND procedures, a record of decision was issued by USEPA for the source control operable unit (the landfill) which defined the final cover structure and certain other measures as a partial solution to groundwater contamination by reducing infiltration, the Department was designated the lead agency for reviewing and regulating construction of remedial measures, and the plan modification was proposed for design and construction of the remedial measures for the source control operable unit.

g. SUPERFUND investigations and review are continuing for the groundwater operable unit, the record of decision for remaining remediation measures for capture of leachate and gas has not yet been issued, and additional design and construction will be required to complete remediation of the environmental effects of the landfill.

h. Department staff conducted a review of the landfill for compliance with locational restrictions, including potential impacts to wetlands as required by ch. NR 103. Construction of the final cover will not result in additional losses of wetland area but may have effects on wetlands adjacent to the east edge of the landfill. Except where regrading of the waste is possible, such effects are unavoidable consequences of the remediation of the landfill effects on groundwater.

i. The remedial action called for in the approved plan modification will affect wetlands, the remedial action is wetland dependent, and the remedial action will not result in significant adverse impacts to wetland functional values, water quality, or other significant environmental consequences.

j. Department staff conducted a review of the landfill for compliance with locational restrictions, including potential impacts to floodplains as required by NR 504.04(3)(c). Past placement of solid wastes filled part of the pre-existing floodplain of the Sheboygan River. Construction would not result in additional placement of additional solid wastes in the floodplain.

k. Construction of the final cover as proposed in the plan modification will result in further loss of floodplain area. If remedial action is conducted in accordance with the conditions of this approval, the intrusion caused by 15 horizontal feet of final cover structure will not result in significant reduction of the floodplain.

l. Construction of the toe drain and stormwater control features of the remedial action, as proposed in the plan modification, will result in unacceptable destruction or loss of integrity of groundwater monitoring wells between the east side of the landfill and the Sheboygan River.

m. Kohler Company did not propose a clay borrow site according to procedures required by s. NR 512.18 and did not obtain approval or grant of exemption from the Department prior to stockpiling clay on the landfill that had been obtained from local foundation excavations.

n. A site inspection was conducted at the landfill on November 14, 1994, to observe attainment of waste final grades, presence of interim cover, and presence of stockpiled clay and cover soils, and to meet with Kohler representatives about future construction and filling of the landfill.

o. A conference call was held on August 1, 1995, between representatives of the Department, Kohler Company, and Geraghty & Miller, to discuss the proposed details of the plan modification, the revised proposals in Kohler Company's comments on the draft approval, timing of future landfill construction, and Department concerns with the plan modification as proposed.

7. S. NR 512.18, Wis. Adm. Code, contains standard investigation requirements for clay borrow sources, and requires that clay borrow sources be investigated in situ and approved prior to utilization.

8. The special conditions set forth below are needed to assure that the construction of the final cover system is conducted in accordance with modern landfill practice, that contaminated seepage water is collected and treated, that long-term care is conducted to maintain the final cover, that the construction of the final cover will be compatible with future construction of remedial measures for leachate and landfill gas, that the location standards and performance standards of s. NR 504.04 are complied with, and that effective monitoring is conducted to assess the performance of the facility.

CONCLUSIONS OF LAW

1. The Department has authority under s. 144.44(3), Stats., to modify a plan of operation approval if the modifications would not inhibit compliance with the applicable portions of chs. NR 500 to 520, Wis. Adm. Code.

2. The Department has authority to approve a modification to the plan of operation with special conditions if the conditions are needed to ensure compliance with the applicable portions of chs. NR 500 to 520, Wis. Adm. Code.

3. The Department has authority to impose monitoring requirements under ss. 144.435 and 144.44, Stats., and ch. NR 508, Wis. Adm. Code, for any non-approved facility, as defined under s. 144.441(1)(c), Stats.

4. The conditions of approval set forth below are needed to ensure compliance with chs. NR 500 to 520 and ch. NR 103, Wis. Adm. Code.

5. In accordance with the foregoing, the Department has authority under s. 144.44, Stats., to issue the following conditional plan modification approval.

GRANT OF EXEMPTION

The Department hereby grants an exemption to Kohler Company Landfill from the requirements of s. NR 512.18, Wis. Adm. Code, under the authority of s. NR 500.08(4), Wis. Adm. Code, for an alternate geotechnical investigation program for documenting clay stockpiled on the landfill for use in a clay capping layer. This grant of exemption shall be limited to the clay soils stockpiled at the landfill as of the date of this approval.

CONDITIONAL CLOSURE PLAN APPROVAL

The Department hereby approves the proposed modifications to the engineering plans for the Kohler Company landfill, subject to compliance with chs. NR 500 to 520, Wis. Adm. Code, and the following:

General

1. All aspects of the construction, operation, monitoring, and closure of this facility shall be performed in accordance with the plan modification, the requirements of NR 500 to 520, Wis. Adm. Code, and the conditions of this approval. In the case of any discrepancies between the conditions of this approval and the approved plans or conditions of any previous approval, the conditions of this approval shall take precedence.

2. A copy of the plan modification, accompanying plan sheets, and this approval and any addenda shall be available at the landfill at all times during the construction periods and shall be available for reference by the personnel responsible for proper operation of this facility. Persons responsible for facility operation, closure, documentation, and monitoring shall be informed of the conditions required in this approval.

3. Any proposed modifications to the plan modification or this approval shall be proposed to the Department for review and approval. If the modifications are compatible with the desired performance of this facility, as determined by the Department, an addendum will be added to this approval indicating acceptance of the modifications. The modifications shall not be implemented prior to issuance of an approval by the Department.

Design and Construction

4. Closure activities at the Kohler Company landfill shall comply with the following:

   a. Construction in 1995 shall include the toe drain on the east side of the landfill, installation of new well nests on the east and west sides of the landfill, abandonment of well nests, and preparation of control structures for erosion and sediment. The leachate control operations shall begin after the completion of the installation of the toe drain and leachate pumping systems.

   b. Construction in 1996 shall include final cover and associated surface and subsurface drainage features on a minimum of 50% (27 acres) of the waste-filled area of the landfill.

   c. Continued filling shall be confined to the waste-filled area and west of grid line E2,591,500 and south of grid line N641,500.

   d. Revised plans which define the schedule for closure activities, the installation of the items listed in this condition, and revised details shall be submitted in the addendum to the plan modification required by this approval. Final contours for the area to be closed in 1996 shall be defined. Final contours for the area to be used for filling in 1996 shall be defined for two scenarios:

      i. Cessation of filling at the end of 1996.

      ii. Cessation of filling where the final grades of the waste mass are limited by maximum sideslopes of 4:1.

5. The following elements of the plan modification shall modified:

a. The leachate toe drain, as shown on plan sheets 10, 11, and 15, shall be modified to assure that all leachate intercepted by the collection trench is hydraulically directed to a collection manhole. The extent of the toe drain shall be defined to extend from grid line N640,400 to N642,900 on the east side of the landfill. The details of the manholes shall be supplemented with pumping equipment, discharge lines to leachate collection tanks or sanitary sewer, and details of the leachate collection tanks or connection to sanitary sewer.

b. The temporary sedimentation basin, as shown on plan sheets 14 and 17, shall not be constructed as proposed. Stormwater controls shall be revised to eliminate stormwater structures or ponding of water on the sideslope or toe of the sideslope of the final cover structure.

6. The final cover system shall be a multilayered structure that incorporates the following layers and dimensions:

a. A grading layer of natural soil covering the waste-filled area of sufficient thickness to eliminate erosion and loss of waste prior to placement of the clay capping layer.

b. A clay capping layer with a minimum thickness of 24 inches.

c. Rooting zone, including a subsurface drainage system, with a minimum thickness of 30 inches.

d. Topsoil with a minimum thickness of 6 inches.

7. Construction of the final cover and surface and subsurface drainage features shall be managed to minimize traffic, soil placement, soil erosion, or other damage and to prevent or correct any filling to the wetland area generally bounded by the waste-filled area and grid lines N641,920 and E2,591,400.

8. Kohler shall provide an assessment of the effect of the presence of the landfill and the final cover structure on the floodway capacity for the Sheboygan River where the current landfill mass is within 200 feet of the Sheboygan River, generally between grid lines N641,250 and N641,920. The assessment shall include the effect of the occupation of the floodway capacity by the final cover system.

9. An addendum to the plan modification shall be submitted to the Department for review and approval within 90 days of the date of this approval. At a minimum, three copies shall be provided to the central office in Madison and two copies shall be provided to the Southeast District Office. The addendum shall include, at a minimum, the following plan sheets and narrative:

a. A phasing plan defining the waste-filled area to be closed in 1996, location of the area to be used for continued filling, and schedule for closure of the entire waste-filled area.

b. Final waste grades due to waste removal, waste regrading, and continued waste filling for the area to be closed in 1996 and the alternative scenarios of waste filling for the area to be filled in 1996 and after.

c. Revised details, plan sheets, grades, specifications, and pumping and discharge details of the toe drain on the east sideslope of the landfill.

d. A revised stormwater control and sediment control system on the east and south sides of the landfill. Stormwater control structures and runoff ditches shall be designed to avoid destruction or disturbance of groundwater monitoring wells on the east and south sides of the landfill.

e. Proposed locations of new well nest to be installed on the east and west sides of the landfill, proposed lists of existing wells which are to be abandoned, and a proposed schedule for installation and abandonment of groundwater monitoring wells.

f. A stockpiling plan for clayey soils, rooting zone soils, topsoil, and any other soil materials to be used for final cover construction, whether obtained from off-site or stripped from the interim cover. Stockpile locations shall not be located over areas of final cover.

g. A proposed clay borrow source or sources documented in accordance with s. NR 512.18 or a request for exemption for an alternative geotechnical investigation under s. NR 500.08(4) for the remaining volumes of clay soils needed for the closure of the landfill.

h. Revised details of the final cover cross-section, drain trenches, drain outlets, and perimeter drains.

i. Plans and details of the layout of the subsurface drainage system, including alignment of the drainage pipes laid over the clay capping layer, location of drain outlets, layout of the perimeter drain, and cross-section details of the drain structures, with the specifications for the granular soils used in the subsurface drainage system and an analysis of the rooting zone soils, sand, gravel, and pipe opening sizes designed to operate as a self-filtering system.

j. Description of the quality control employed by Kohler Company for control and documentation of final waste grades, grades of each layer of the final cover structure, soil testing and sampling, use of Kohler Company employees and contractors, and staffing level

for on-site supervision, surveying, soils testing, and other documentation.

k. The assessment of the effect of the final cover construction on the floodway of the Sheboygan River and any modifications to the waste final contours and final cover contours in the area of closest proximity to the River.

10. Preconstruction meetings shall be held prior to the initiation of construction of the toe drain, prior to initiation of the first phase of final cover construction, and prior to final cover construction at the end of filling. The meetings shall be used to clarify or confirm design changes, acceptability of selected construction materials, construction concepts or practices, and requirements of the plan modification or this approval. The meetings shall also be used to clarify interactions of construction of the groundwater remediation measures with construction of the toe drain, final cover, and surface and subsurface drainage systems. At a minimum, the meeting shall include the project manager, engineering consultant, earthwork contractor, quality assurance personnel, the owner's technical representative, and the assigned Department district and central office staff.

11. Construction of the final cover system and control of surface and subsurface drainage shall comply with the following:

a. Erosion controls shall be installed prior to the initiation of regrading and other construction of the final cover. Erosion controls shall be maintained until cover vegetation has been established on the final cover.

b. A minimum thickness of 36 inches of rooting zone soil, subsurface drain layers, and topsoil shall be maintained over the clay capping layer of the final cover at all locations on the final cover.

c. The subsurface drainage layers, piping, and subsurface drains, as shown on plan sheet 15, shall be restricted to the 12 inches of rooting zone immediately above the clay capping layer. The subsurface drain outlets shown on plan sheets 11 and 16 shall be revised to discharge water beyond the limits of the waste-filled area.

d. The inverts of any diversion berm channels installed for surface water control shall be lined with erosion control mats. The diversion berm channels and final cover spillways shall be planted with vegetation which is resistant to erosion, abrasion, and temporary submergence caused by flowing surface water.

e. The topsoil on the final cover system shall be seeded with a cover crop within 30 days of topsoil placement.

f. The seed mix used to revegetate the topsoil on the final cover system shall be amended with a cover crop and shall include 10 to 25% native species in the seeding mix. The selected seed mix shall be amended with seed mixes 20 or 70 and seed rates, as defined in the Wis. DOT 1989 Standard Specification for Road and Bridge Construction, if use of the proposed seed mix does not result in an erosion-resistant vegetative cover by June of the year following topsoil placement on the final cover.

12. The placement of the clay capping layer of the final cover shall comply with the following, unless other methods are approved by the Department:

a. The clay capping layer shall be constructed in lifts with maximum thickness of 6 inches after completion of compaction. All clay lifts in the capping layer shall be constructed using sheepsfoot-type compaction equipment having feet no longer than the compacted lift thickness after compaction. Clay shall be disked prior to compaction to break up clods and allow for moisture content adjustment as needed. The Department recommends that all compaction equipment utilized have a minimum static weight of 30,000 pounds.

b. The junction of the clay capping layer installed during different construction seasons shall be accomplished by cutting a stepped key into the existing clay capping layer with a minimum of three steps of maximum height of 8 inches and minimum width of 4 feet. Clay capping soil shall be compacted into the stepped key and documented as part of the construction of the subsequent construction event.

c. The perimeter of the clay capping layer shall be keyed into existing ground beyond the waste-filled area by a trench cut a minimum of 3 feet deep and 3 feet wide and backfilled by clay compacted in 6 inch lifts.

d. Thickness measurements of the clay capping layer, rooting zone, and topsoil shall be performed on a 100 foot grid. A modified grid shall be used in areas where the contour of the clay vary within the 100 foot grid.

e. Any grade stakes or other construction or surveying appurtences or any holes used to document thickness of lifts shall be removed from the clay component of the liner and capping layer, and the holes shall be backfilled with compacted clay soil or granular bentonite tamped into the holes.

13. Daily quality assurance inspector's records shall be prepared for each day that significant earthwork is either attempted or accomplished. The records shall describe changes or adaptations to the approved construction practices, testing and sampling performed, progress achieved, and nonconforming conditions of subgrade, soils, weather

conditions, or other problems. The records shall be included in the construction documentation required by this approval.

14. Monthly status reports shall be provided to the Department's Southeast District office and the central office that describe the progress of major construction during each construction season when final cover is being constructed. Preparation of the status reports may be suspended during the months of January to March. Status reports shall be provided in written form unless an alternative contact method is proposed and accepted.

15. Construction inspections shall be performed at this facility as indicated below for final construction during the 1995 construction seasons and during completion of final cover construction. The Department shall be notified a minimum of one week prior to beginning each of the construction events listed below for the purpose of allowing the Department to inspect the work. A fee shall be paid to the Department for each required inspection in accordance with c. NR 520.04(5), Wis. Adm. Code. The inspection fees shall be paid at the time the construction documentation is submitted to the Department for review.

    a. Construction of the toe drain.

    b. Construction of the clay component of the capping layer.

    b. Placement of the drain layer and rooting zone soils.

Continued Filling Operations

16. The disposal of slurried wastes at the landfill shall cease after June 30, 1996. Dusts, sludges, slurries, and other wet wastes shall be dewatered, solidified, or stabilized before disposal. After June 30, 1996, no free liquid wastes shall be disposed of in the Kohler Company landfill.

Documentation and Reporting Requirements

17. Three copies of site construction documentation shall be submitted to the Department for review and approval within 90 days of completion of final cover construction in 1995 and within 90 days of completion of each subsequent phase of final cover construction. Site construction documentation, including sampling and testing of soils, shall be performed in accordance with the requirements of NR 516 and this approval. Three copies shall be submitted to the central office in Madison and two copies shall be submitted to the Southeast District office.

18. Site construction documentation shall include the following additional plan sheets and graphics:

a. Location of subsurface drains, perimeter drains, drain pipes and outlets, permanent access roads, stormwater control structures, and the alignment of the final cover drainage systems.

b. For documentation of the first phase of final cover construction, plan sheets showing remaining fill area for continued waste disposal and anticipated final waste grades in the areas subject to continued filling.

c. Detail drawings shall be constructed and photographs shall be taken that record the construction of the following:

i. Location of all subsurface drain lines, drain trenches, and drain outlets.

ii. Compaction methods used in placement of the soil components of the final cover, including equipment specifications and number of passes.

iii. All manufactured components installed as part of construction, including drainage pipe, geotextiles, culvert pipe, and collection sump.

iv. Stormwater control structures.

v. Subsurface drain trench assembly, showing sequence of placement of sand, gravel, geotextile, and pipe.

19. Site construction documentation shall include the following in the narrative and appendices of the bound report:

a. The report shall include written verification by the persons listed below that the construction was completed in accordance with approved plans with any deviations noted:

i. Persons responsible for quality control and quality assurance for clay soil testing and compaction.

ii. Persons responsible for surveying of waste final grades and thickness of final cover layers.

iii. Supervisor of earthwork construction.

b. The report shall describe construction in chronological fashion. The description shall be based upon the daily inspector's reports required by this approval. The following shall be included:

i. Any deviations from the approved plans and the rationale for such deviations.

ii. Description of all actions taken to prepare or condition the compacted clay component.

iii. Description of controls and methods used to document thickness of final cover layers.

iv. A chronological record of the start and completion of placing each component of the final cover.

v. Identification of contractors and subcontractors involved in the construction of soil layers, subsurface drainage and piping systems, and other landfill appurtences.

c. The report shall identify sources for the clay capping layers, soil sampling data, locations of borrow sources, identification of soil units that borrow sources belong to, and description of the controls used to assure quality of the clay soils obtained from the borrow sites.

d. The report shall include narrative, observations, and tabulated data for all tests conducted on subgrade investigations, compacted clay and other soil materials used in construction of the final cover or the subsurface and subsurface drainage systems.

e. The report shall include grain size analysis data and graphs from the sampling of sand and gravel used in subsurface drains at a rate of one sample per 1,000 cubic yards, or a minimum of 3 samples for sand and a minimum of 3 samples for gravel.

f. The report for documentation of the first phase of final cover construction shall include a description of the remaining fill capacity, remaining fill life, and anticipated construction schedule of the closure of the remaining fill area.

g. The report for documentation of the first phase of final cover construction shall include a description of the measures to be taken to dispose of slurried wastes, measures taken to solidify slurried wastes prior to disposal, and anticipated disposal volumes of dewatered or solidified slurried wastes.

h. The report shall identify seeding mixes and seeding rates used for revegetation of the topsoil, including use of any cover species, mulch, fertilizer, and other soil amendments.

i. The report shall document any monitoring point removed, damaged, replaced, or repaired during construction.

20. An annual report shall be submitted to the Department after the 1996 construction season. The annual report shall document the performance and maintenance of the final cover and drainage systems. The annual report shall be submitted no later than March 1 of each year. The frequency of submittal of the report may proposed to be altered after the fifth year following final closure of the landfill. The report shall include the following:

a. Any evidence of erosion, differential settlement or impeded drainage, exposed capping layer, rooting zone, or subsurface drain materials, soil slumping or downslope movement, integrity of surface swales and other drainage features, any evidence of water ponding or formation of depressions, and cover condition in the surface water drainageways.

b. An evaluation of the condition of the final cover vegetation, vegetative cover vigor and diversity, and animal intrusion.

c. A description of groundwater flow and quality trends, based upon the groundwater monitoring data generated over the past year, with a comparison to data from previous years and a plan sheet with water table contours drawn from the sampling period of the past year with the highest water table elevations.

d. A description of all reparative actions taken for erosion, vegetative cover, protective structures, monitoring devices, and stormwater control structures.

e. For the reports generated prior to site closure, a summary of site filling rates, remaining capacity, and schedule of anticipated final closure.

f. Updated plan sheets of surface topography and features, including drainage patterns and remedial actions taken to correct settlement effects, and description of any changes in final use of the landfill area, including areas not used for waste filling.

g. Photo documentation of overviews as well as construction details and vegetation assemblages.

Monitoring

21. The following monitoring wells shall be abandoned in accordance with NR 508.07 Wis. Adm. Code within 90 days of the date of this approval:

Well Name	DNR ID#
5	207
5D	218
11	244
11D	230
OW2	235
1A	201
1B	202
1C	203
1D	215
3	205
4	206
6	208
8	212

13C	263
13P	246
13SR	265

Appropriate documentation of the well abandonment activities shall be performed in accordance with Condition #25(c) and submitted to the Department.

22. The groundwater monitoring program shall be amended as follows:

a. Two monitoring well nests shall be installed on the west side of the landfill, outside the limits of fill, to replace monitoring well nests 5 and 11. Each nest shall include one water table well and one piezometer. The well nests shall be located within 50 feet of grid locations N640,600, E2,590,490 (near the location of SB1) and N641,300, E2,590,300, unless those locations are unaccessible. If these locations are determined to be unaccessible, the Kohler Company shall propose alternate locations for the new west side well nests to the Department.

b. The upper member of each well nest shall intersect the water table, and the piezometer shall be screened near the top of the lower till unit. All wells and piezometers shall be installed in accordance with NR 508.05 and NR 508.06, Wis. Adm. Code, within 90 days of the date of this approval. Well installation and development documentation shall be performed in accordance with Condition #25 and submitted to the Department.

23. Kohler Company shall conduct ground water monitoring at the Kohler Company Landfill in accordance with the following:

a. Upon the effective date of this plan modification, the following monitoring wells and all new wells required by this approval shall be sampled quarterly and water samples analyzed by the Kohler Company during the March, June, September and December sampling quarters.

Well Name	DNR ID#
OW-1	234
OW-1-SR	250
2D	216
2-SR	252
3D	217
3-SR	254
6-RE	256
6-SR	257
6-DR	258
8-RE	259
8-SR	260
12	231
12D	232

13A	262
13C-2	264
13-SR-2	266
14	267
14-SR	268

These wells shall be sampled for the following parameters:

Parameter	DNR ID#
pH, field	00400
conductivity, field	00872
temperature	00010
water elevation	00842
alkalinity	39036
chloride	00307
COD, filtered	00341
hardness, filtered	22413
phenols, total	00129
sodium, dissolved	00930
sulfate, dissolved	00946

These wells shall also be monitored annually during the June sampling quarter for the following additional parameters, beginning with the June, 1996, sampling quarter.

Parameter	DNR ID#
aluminum, dissolved	00250
antimony, dissolved	01095
arsenic, dissolved	01000
barium, dissolved	01005
beryllium, dissolved	01010
cadmium, dissolved	00312
chromium, dissolved	00273
copper, dissolved	00277
fluoride, dissolved	00950
iron, dissolved	01046
lead, dissolved	00240
manganese, dissolved	00316
magnesium, dissolved	00925
nickel, dissolved	00276
NO^2NO^3-N	00631
selenium, dissolved	01145
silver, dissolved	01075
zinc, dissolved	00275

VOC scan (using EPA Solid Waste Method 8021 for required compounds listed on form 4400-107A (Part A) or 8260 for required compounds listed on form 4400-107 (Parts A and B) - DNR ID# 84085

b. The following monitoring wells shall be sampled semi-annually during June and December of each year for groundwater elevation and VOCs using U.S. EPA Solid Waste Methods 8021 or 8260, including all compounds listed in EPA Document SW-846, 3rd Edition, July, 1992, beginning with the December, 1995 sampling quarter.

Well Name	DNR ID#
15	269
15-SR	270
15-DR	271
16	272
16-SR	273
17	274
17-SR	275
18-SR	276
18-DR	277

c. All remaining monitoring wells not otherwise specified in this plan modification, shall be monitored quarterly during the March, June, September and December sampling quarters for groundwater elevation (00842), beginning with the effective date of this plan modification.

The ground water analyses specified above shall be performed by a State of Wisconsin certified laboratory. The laboratory shall utilize an analytical methodology with a limit of detection and limit of quantification at or below the preventive action limit as required per ss. NR 140.16, Wis. Adm. Code. The analytical results shall be submitted to the Department electronically on computer disk or on Department-generated TADs.

24. If the location of any monitoring well listed above, with the exception of the wells listed in Condition #21, conflicts with the construction of any of the design elements contained in this plan modification, the Kohler Company shall propose to the Department that those wells be abandoned and replaced with similar wells in nearby locations. The replacement wells shall be incorporated into the ground water monitoring system for the Kohler Company Landfill and shall be subject to the same monitoring requirements as the wells they are intended to replace.

25. All new and replaced monitoring wells shall be designed, installed, developed, sampled and documented according to chs. NR 508 and NR 141, Wis. Adm. Code.

a. The documentation for the site's monitoring system shall include a Groundwater Monitoring Well Information Form 4400-89 (WIF, updated 1-90). This form shall list all monitoring points, including: new wells, old wells, abandoned wells, private wells, surface water monitoring points, lysimeters, leachate sampling points, and leachate head wells.

b. The documentation of each well shall include:

i. A Monitoring Well Construction Form 4400-113A (updated 4-90)
ii. A Monitoring Well Development Form 4400-113B (updated 4-90)
iii. A Soil Boring Log Information Form 4400-122

c. All wells listed in Condition #21 shall be abandoned per NR 141.25(2)(c) Wis. Adm. Code. The documentation of any abandoned monitoring wells or boreholes shall include:

i. A Soil Boring Log Information Form (mentioned above), if available
ii. A Well/Drillhole/Borehole Abandonment Form 3300-5B (updated 8-89)

d. Weather-resistant and legible labeling of DNR point identification shall be placed on each groundwater monitoring well protective casing.

All documentation regarding monitoring well abandonment, replacement and construction shall be presented in the form of a report to be submitted to the Department no later than March 1, 1996.

The Department retains the jurisdiction to either require the submittal of additional information or to modify this approval at any time if, in the Department's opinion, conditions warrant further modifications. Unless specifically noted, the conditions of this approval do not supersede or replace any previous conditions of approval for this facility.

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin Statutes and Administrative Rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to ss. 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

This notice is provided pursuant to s. 227.48(2), Stats.

Dated: AUG 2 9 1995

DEPARTMENT OF NATURAL RESOURCES
For the Secretary

Lakshmi Sridharan

Lakshmi Sridharan, Ph.D.,P.E., Chief
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

Robert P. Grefe

Robert P. Grefe, P.E.
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

Philip Fauble

Philip Fauble, Hydrogeologist
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

Department of Natural Resources

DATE: January 25, 1995

TO: Solid Waste Unit Leaders

FROM: Robert Grefe - SW/3

SUBJECT: Recommendations for Use of Stockpiled Soils and Construction Excavation Waste Soil for Clay Capping Soils

The attached guidelines provide guidance on investigating clayey soils that were stockpiled prior to investigating for geotechnical properties or which an applicant wants to obtain from excavations for building foundations.

Background

The attached guidelines were developed to respond to a situation that occurred during 1993 and 1994, involving the Kohler Company landfill, the WP&L-Edgewater landfill, and Buteyn Excavating, Inc., in Kohler and Sheboygan. Kohler and WP&L obtained clayey soils from building construction excavations for use as clay liner and clay capping layer materials but did not propose a clay borrow site under NR 512.18 or to request an alternative under NR 500.08(4). Our awareness of these activities came about due to verbal references made by Kohler during meetings on the Superfund investigation of the landfill.

Kohler Company apparently began purchasing soils excavated by Buteyn in December 1993 and through 1994. They had sent a letter dated August 25, 1994, with soil testing data performed by Buteyn after verbally informing us of their desire to use soils supplied by Buteyn. At the time we inspected the landfill on November 14, 1994, Kohler had accumulated over 100,000 cubic yards in a single stockpile on the landfill area.

During the November 14, 1994, landfill inspection and meeting, Kohler representatives claimed that Buteyn was a large earthworking contractor, that all clay soils were obtained from a limited area of development between Kohler and Sheboygan, and that Buteyn employed a soil scientist who took soil samples at the excavations. Some confirmation samples were apparently taken after delivery at the landfill and tested by the same lab as the source samples. Kohler's explanation did not indicate that Kohler representatives supervised or observed either excavations or soil sampling.

Kohler claimed at the November 14, 1994, meeting that Buteyn used clay from construction excavations for the most recent liner and final cover construction at the WP&L-Edgewater landfill. We were unaware of this use at the time of the meeting, but Sue Fisher confirmed later that WP&L had also obtained clay from Buteyn without any attempt to contact her before the fact or to document the clay sources as required by code.

It is not clear why Kohler or WP&L chose to obtain the local clays in the manner they did, and it appears that we could take an enforcement approach to the use of clay without approval. The soil testing data provided by Kohler and by WP&L indicate that the clay soils appear to meet clay liner quality requirements of s. NR 504.05(5).

The attached guidelines are slightly modified from the version developed prior to the meeting with Kohler on November 14, 1994, and provided to Kohler at that time. Our intent is that Kohler will document the stockpile they already assembled and that both Kohler and WP&L propose and follow an approved program for use of clayey soils from future construction excavations.

Review Procedures and Precautions

An applicant can follow the soil sampling and documentation requirements of s. NR 512.18 and submit the information for review using current procedures. The short time periods between owners' deciding to proceed with construction and the award of bid to an excavation contractor limit the applicability of code-specific investigations. Construction excavations are subject to local building permits and stormwater controls but usually not to Department environmental reviews. This minimizes our authority to investigate a site for land use and environmental effects. If Department review of environmental effects is precluded, an alternative to the review process in s. NR 512.18 can concentrate on investigation of geotechnical soil properties.

The procedures in the guidelines should be followed to formally obtain an exemption under s. NR 500.08(4) from the code requirements of s. NR 512.18. For most clay borrow sites, there should be no reason to exempt an applicant from the NR 512.18 investigative and review procedures, particularly for proposed sites going through the siting and environmental review process. An exempted process is also not appropriate for sites that will not be excavated for any reason other than clay extraction.

The general review sequence should be:

> An applicant should propose to be exempted from the requirements of s. NR 512.18 by applying for an exemption in accordance with s. NR 500.08(4), propose an investigative program following the guidelines, propose soil testing during construction in accordance with ch. NR 516, and include a plan review fee of $500 as required by ch. NR 520.
>
> The Department determination on the exemption request should be issued in writing and include any conditions needed to assure use of appropriate soils, soil stockpiling, construction, or other items. One of the conditions should require the applicant to submit clay soils data for review prior to proceeding with placement of clay. Until a determination is issued, the applicant has no justification to proceed with use of construction excavations.
>
> The data obtained from the excavated and stockpiled soils should be tabulated by the applicant by source and provided to the Department in a

letter report prior to use of the soil in liner or final cover construction. Department concurrence with the apparent acceptability of the clay should be provided by a letter, not an approval.

Construction documentation should follow the requirements of ch. NR 516. Data taken from the clay source investigations should not be used to substitute for the testing frequencies and parameters in ch. NR 516. Construction documentation should include both source and construction data.

There are some potential problems with this approach, which the investigative procedures in s. NR 512.18 were deliberately intended to avoid. Use of stockpiled soils or discontinuous excavations eliminates any potential to interpolate soil qualities between soil borings or sampling locations, which can significantly aid of defining insitu borrow sites. Stockpiling complicates control of soil moisture contents and eliminates cues that an engineering technicians can use to determine if additional compaction curve or gradation testing should be performed due to spatially changing soil properties. If unacceptable soils are present in a stockpile, it may be difficult or impossible to separate them cleanly from the surrounding mass of soils from other sources. Since it is in the contractor's interest to remove soils from excavations rapidly and to sell soil that has to be removed from excavations, there is limited opportunity for independent verification of soil properties or to change testing or excavation methods.

attachment

cc. Lakshmi Sridharan - SW/3
Sue Fisher - SW/3
Roger Klett - SED

RECOMMENDATIONS FOR THE TESTING OF STOCKPILED CLAYEY SOILS AND CONSTRUCTION EXCAVATIONS

EXISTING STOCKPILES

The following program is recommended as a means to overcome the lack of information and the difficulty or impossibility of interpolating soil qualities for soils in stockpile that come from sources not characterized in accordance with s. NR 512.18, Wis. Adm. Code.

Provide a map of the sources used to supply the stockpile.

Survey and draft a plan sheet of the stockpile and surrounding features pertinent to its slopes, drainage, etc. Compute the inplace volumes or provide records of the volumes excavated at the sources.

Define the glacial geological and soils units that the clay came from and demonstrate that those units are likely to supply liner-quality clay soils.

Describe the method used by the construction contractor and the stockpile owner to select samples for such testing data as exist, i.e., frequency, sampling at the source vs. at the stockpile, observations or guidance by soils technicians, controls on excavating clay soils and separating them from undesirable soil types.

Present data generated by the contractor and stockpile owner. Data should cover the following soil tests: grain size analyses to the 5 micron (illustrated as a semilog particle size gradation graph, not a tabulation), liquid limit and plasticity index, compaction curves (using standard or modified Proctor methods), and hydraulic conductivity.

Assign a 50 foot grid to the stockpile. Cut benches as needed to allow access by a boring rig. Core to the base of the stockpile, collect a soil sample from the middle of the core, and note inclusions of sand, gravel, silt, or other non-clay soils. For grid points where stockpile thickness is greater than 10 feet, take a sample every 10 feet.

Test all samples for grain size analysis (to the 5 micron sieve and plotted on a semilog particle size gradation graph), liquid limit and plasticity index. Assure that sufficient samples are tested to achieve a minimum testing rate of one set of sample results per acre-foot of insitu soil. Test one third of the samples for compaction behavior (using 5 test points for each curve) using either the standard Proctor or modified Proctor test procedures. Also test one third of the samples for hydraulic conductivity.

Present all data, plan sheets and maps, soils tests, and geological information in a report and submit to the Department for review, along with a request for an exemption under s. NR 500.(4) for an alternative geotechnical investigation program to the requirements of s. NR 512.18.

CONSTRUCTION EXCAVATIONS

Either perform a geotechnical investigation as described in s. NR 512.18 or request an exemption under s. NR 500.(4) for an alternative geotechnical investigation program to the requirements of s. NR 512.18.

For a geotechnical investigation as described in s. NR 512.18, each proposed construction excavation location should be investigated and characterized. A single investigation can be used to summarize the data for several proposed excavations locations. The report required in s. NR 512.18 should describe the likely timetable for the excavations and the location of stockpiles. The report should state if the selection of material to go to a clay soil stockpile will be performed under the direction and in the presence of a soils engineer or soils technician.

At a minimum, the following items should be included in a request for an exemption under s. NR 500.(4) for an alternative geotechnical investigation program.

Include a set of proposed target glacial geological strata or formations which contain soils most likely to meet the required clay soil specifications. The proposed target soils should be defined by a limited geographic area and by recognizable geological strata to minimize encountering variations in soil qualities.

Propose employment of a soils engineer or soils technician to be present at all occasions when clay soil is to be excavated. The engineer or technician is to be employed or contracted for by the purchaser of the clay soils, not the excavation contractor. The engineer or technician is to provide direction to the contractor as to what portions of the excavation are suitable stockpiling as acceptable clay soils. The engineer or technician is to be responsible for taking soil samples for testing to be conducted by the purchaser of the clay soils.

Test all samples for grain size analysis (to the 5 micron sieve and plotted on a semilog particle size gradation graph), liquid limit and plasticity index. Assure that sufficient samples are tested to achieve a minimum testing rate of one set of sample results per acre-foot of insitu soil. Test one third of the samples for compaction behavior (using 5 test points for each curve) using either the standard Proctor or modified Proctor test procedures. Also test one third of the samples for hydraulic conductivity.

Sizing
Part B

WISCONSIN
DEPT. OF NATURAL RESOURCES
George E. Meyer
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
Box 7921
Madison, Wisconsin 53707
DNR TELEPHONE 608-266-2621
DNR TELEFAX 608-267-3579
DNR TDD 608-267-6897
SOLID WASTE MGMT 608-266-2111
SOLID WASTE TELEFAX 608-267-2768

September 6, 1995

Mr. Richard Pfarrer
Kohler Company
444 Highland Drive
Kohler, WI 53044

FILE REF: FID# 460015380
Sheboygan Co.
SW
Correspondence

SUBJECT: Review of the Environmental Contamination Assessment (ECA) and Ground Water Remedial Action Alternatives Report for the Kohler Company Landfill, Kohler, Wisconsin - License #01508

Dear Mr. Pfarrer:

The Department of Natural Resources (Department), Bureau of Solid and Hazardous Waste Management is issuing the enclosed plan modification approval in response to your November 16, 1992 report entitled, "Environmental Contamination Assessment And Ground Water Remedial Action Alternatives Report, Kohler Company Landfill, Kohler, Wisconsin", prepared by Geraghty & Miller, Inc., and follow up responses from both the Department and the Kohler Company. This report was submitted in response to a request from the Department after the WDNR assumed the role of lead agency for this project from the U.S. Environmental Protection Agency (U.S. EPA) on June 10, 1992.

SUMMARY OF PAST ACTIONS

The Kohler Company landfill was ranked by the U.S. EPA in 1983 and subsequently placed on the National Priorities List (NPL) in 1984 because ground water monitoring around the perimeter of the landfill indicated the presence of contaminants. Since that time, a Remedial Investigation (RI) was prepared and approved by the U.S. EPA in September of 1991, and a draft Feasibility Study (FS) was submitted in April of 1991. The U.S. EPA then split the site into two separate "operable units" on May, 1991, one for source control and another for ground water. A Record of Decision (ROD) for the source control unit was signed March 30, 1992, and evaluation of the FS and preparation of a ROD for the ground water operable unit was assigned to the WDNR.

The November, 1992 report contains an assessment of the ground water contamination resulting from past and present disposal practices at the landfill in accordance with the requirements of s. NR 140.24(1), Wis. Adm. Code. The second half of the report contains an evaluation of the remedial action alternatives proposed to prevent any new releases from the landfill and to restore contaminated ground water in accordance with the requirements of s. NR 140.24(2), Wis. Adm. Code.

In response to your report, the Department issued a draft conditional modification of the Kohler Company Landfill's operating plan approval on

December 3, 1993. The Kohler Company submitted a response on April 27, 1994 and objected to many of the comments and conditions contained in the draft plan modification. As a result, the Department and the Kohler Company scheduled a series of meetings regarding additional information needed to select the most appropriate ground water remedial alternative. In addition to these meetings, the Kohler Company submitted a remedy analysis for the ground water operable unit on October 10, 1994 as a result of an August 18, 1994 meeting between Kohler and WDNR representatives. The Department responded with a January 20, 1995 letter to the Kohler Company outlining all previously mentioned remedial alternatives and defining which alternatives would meet the intent of ch. NR 140 Wis. Adm. Code requirements.

As a result of a series of meetings held on February 6, 1995, Jim Schmidt of the Department's Water Resources Management Bureau was asked to evaluate all available water quality data to determine whether or not ground water currently discharging from the Kohler Landfill was adversely impacting the Sheboygan River. Based on his analysis, Mr. Schmidt identified dissolved silver as a parameter of concern with respect to acute toxicity to aquatic organisms. The Kohler Company, however, maintained that the elevated silver results were erroneous. As a result, the Kohler Company and the Department collected additional ground water samples from monitoring wells assigned to "Sample Delivery Group No. 5" in the ECA report on June 13-14, 1995 and had them tested for dissolved silver. The analytical results indicated that some of the silver concentrations detected in the initial sampling rounds may have been elevated due to laboratory testing difficulties.

In a memorandum dated August 31, 1995, Mr. Schmidt evaluated the new data and concluded, "...that the concentrations currently being encountered in wells in the vincinity of the Kohler Landfill are below those which would pose potential short-term concerns to aquatic life from exposures to silver." This finding may affect the time frame within which Kohler needs to meet ground water standards and remediate the ground water contaminant plume.

The attached plan modification follows the basic outline of the December 3, 1993 draft plan modification with some variations based on the Department's subsequent discussions and correspondence with the Kohler Company. This plan modification approval requires the further evaluation of several remedial options, the evaluation of various disposal methods for contaminated liquids and vapors, and the submission of an addendum to the November 16, 1992 ECA report. You should attach this conditional modification to your August 30, 1976 operating plan approval.

RESPONSE TO RECENT COMMENTS

The Department mailed a draft of this letter and the attached approval to the Kohler Company on March 16, 1995. On April 13, 1995 we received a letter from the Kohler Company requesting an extension on the comment period for the draft approval. The Department granted the Kohler Company an extension of the comment period until May 31, 1995. On May 31, 1995 we received a letter dated May 30, 1995 containing comments to this plan modification. The comments

received have been considered and changes were incorporated into the text of the plan modification when they were deemed appropriate. The following is an overview of the Departments' rationale behind the acceptance or denial of several of the comments regarding the plan modification requests.

Kohler's response to the Department's statement that the criteria and levels of federal ACLs were not spelled out in the ECA document, was that Kohler had prepared and submitted a document to the U.S. EPA in April of 1992 spelling out the criteria for the establishment of federal ACLs. A sentence describing this submittal will be included in the narrative.

The reference on page 7 concerning the nature of some waste material that was disposed of within the landfill will be modified for clarification. Kohler's records indicate that wastes that would be considered hazardous under current federal and state definitions were disposed of within the landfill prior to the establishment of hazardous waste regulations.

In regards to Geraghty & Miller's ground water and infiltration modelling efforts, it is important to note that models, while potentially useful tools for helping to explain conditions at a site, have numerous limitations. For instance, the HELP models generated in the report rely heavily on parameters that are based on generalized numbers and locations (e.g. the model in the ECA used average precipitation and temperatures from Madison, WI) that may not reflect actual site conditions. The implied level of accuracy for the HELP model (0.3 inches per year) is misleading because site specific data was not collected to verify the data assumptions.

The HELP model was designed for the purposes of comparing various landfill capping designs. The HELP model was not intended for calculating general recharge to ground water at a site, as was done by Geraghty & Miller in the ECA report to determine a recharge rate of 3.11 inches per year. The HELP model also fails to account for long-term dewatering of waste materials that are most likely already saturated due to ongoing disposal of slurry wastes within the landfill.

The Department's comments regarding limitations of the SVE system will be slightly modified to include all inorganics as well as metals. Some of these compounds are not considered "target compounds" under federal guidelines. However, the Kohler Landfill must also meet the state ground water standards as established in NR 140, Wis. Adm. Code, including standards for such things as chloride, sulfate, nitrates and iron.

Kohler's comment letter dated May 30, 1995 also contains the statement that, "Kohler Co. concurs with the Wisconsin Department of Health's (WDOH) conclusion that the landfill does not pose a risk to public health and the environment." The January 24, 1995 Public Health Assessment for the Kohler Company Landfill specifically addresses potential public health concerns, but does not come to a conclusion regarding the landfill's potential impact to the environment.

The following items are a summary of the report's contents, our review comments, and an outline of the conditional approval.

REPORT SUMMARY

Environmental Contamination Assessment

The Kohler Company currently operates a landfill in the Village of Kohler under WDNR Solid Waste License #01508. The landfill is permitted to accept only non-hazardous manufacturing waste from the Kohler plant, primarily foundry sand and pottery cull. The landfill has been in operation since the early 1950s and certain RCRA-defined hazardous wastes were disposed of at the site. This practice continued until 1980, when disposal of all hazardous materials at the Kohler landfill ceased. These wastes consisted mostly of hydraulic oils, solvents, paint wastes and plating sludges that were disposed of in several pits within the landfill area.

The primary geologic units present at the landfill consist of an upper glacial till unit, a middle till unit, and a lower till unit overlying a fractured Silurian-aged dolomite formation. Alluvium is present near the Sheboygan River overlying sections of the upper and middle till units that have been eroded away. Fill material was subsequently placed on top of both alluvium and the upper till unit.

The upper till unit consists of approximately 25 feet of clayey, sandy silt in areas where it has not been removed due to erosion. The middle till unit consists of approximately 20 feet of silty clay. The lower till unit consists of poorly sorted clays, silts and sands approximately 15 feet thick. The Niagaran Dolomite bedrock is approximately 700 feet thick and extensively fractured near the surface.

The subsurface of the site can be divided into three distinct hyrogeologic flow regimes. The fill material, upper till and the alluvial deposits, where present, have similar hydraulic conductivities and comprise the unconfined upper aquifer. The upper aquifer is perched above the middle till unit that acts primarily as an aquitard separating the upper and lower flow regimes. Because of its relatively high clay content, the middle unit has a fairly low hydraulic conductivity. The lower till unit and the dolomite bedrock make up the lower, semi-confined aquifer. The lower till unit and the dolomite have similar hydraulic conductivities and are in communication with each other. However, the dolomite bedrock differs from the lower till unit in that the dolomite has substantial secondary porosity in the form of large fractures. These fractures tend to transmit large quantities of water along preferential flow paths.

Ground water flow at the site is predominately from the west to the east with some radial flow away from the center of the fill area. There are downward gradients on the western edge of the landfill and strong upward gradients near the eastern toe of the landfill and within the floodplain of the Sheboygan River. Evidence suggests that the Sheboygan River is a local discharge point

and that ground water from the upper flow regime and a portion of the upper part of the lower flow regime ultimately discharges into the river. The presence of contaminants within the lower aquifer indicates that there is some communication between the upper flow regime and the lower flow regime, mostly via leakage through the middle till unit. The lower part of the lower flow regime eventually discharges into Lake Michigan, several miles east of the site.

Ground water quality sampling was conducted at monitoring wells located within and around the perimeter of the waste fill area. Results from this sampling indicate that ground water within both the upper and lower flow regimes is being adversely impacted by contaminants originating from within the fill area. Contaminants in the ground water include volatile organic compounds (VOCs) such as trichloroethene, 1,1 dichloroethane, 1,2 dichloroethene and vinyl chloride, semi-volatile organic compounds including phenols and polyaromatic hydrocarbons (PAHs) and metals such as chromium, lead, copper and zinc. Many of these contaminants were consistently detected at levels that were above the Enforcement Standard (ES) limits for these compounds as listed in ch. NR 140.10, Wis. Adm. Code. Department records indicate that several downgradient wells also contain levels of sulfate and chloride in excess of the ES limits.

To further delineate the extent of the contamination present within the fill area, soil vapor and soil boring samples were collected and analyzed. The soil vapor survey indicated that the elevated levels of VOCs were concentrated in several areas within the fill. These areas include the Old Waste Pit, the Northern and Southern Burn Pits as well as several other locations. VOCs detected by the soil gas survey include vinyl chloride (as high as 93,047 micrograms per cubic meter), trichloroethene (as high as 154,307 ug/m^3) and xylenes.

Results from the soil boring sampling program indicate that the fill material contains detectable quantities of VOCs, semi-volatiles and metals. Areas of elevated soil VOC concentrations, mostly trichloroethene and 1,2-dichloroethene, appear to be limited to the old waste and burn pits. Detectable amounts of semi-volatiles and metals appear to be spread throughout the fill area and were found in a majority of the soil samples tested. Semi-volatiles detected include phenols, PAHs and polychlorinated biphenols (PCBs). The metals chromium, lead, copper, zinc, as well as several other metals, were detected in the soil samples. Some semi-volatiles and inorganics are likely originating from the non-hazardous wastes that make up the bulk of the waste fill material at the landfill.

Remedial Action Alternatives

Based on the information gathered in the ECA report, Kohler submitted a remedial action assessment report that presented several possible remedial response actions. The potential responses ranged from no action to ground water collection and treatment. Under the conditions of the March, 1992 Source Control ROD, Kohler is required to close the landfill, place an approved WDNR landfill cap, install a perimeter collection drain system, and

restrict access and use of the landfill property. Any action taken to remediate the ground water contamination must take into account the effect that implementation of the source control will have on conditions at the site.

After presenting three possible remedial alternatives, a base cap, a base cap with soil vapor extraction (SVE), or a base cap with accelerated dewatering, Geraghty & Miller recommended that Alternative #2, the base cap with SVE, be chosen as the ground water remediation option for the Kohler landfill. In addition, they recommended a long-term monitoring program consisting of the existing ground water wells as well as the establishment of alternate concentration limits (ACLs) for ground water contaminants.

The base cap would consist of a 2 foot thick clay cap as required by the Source Control ROD. The details of the cap construction are contained in a proposed Plan of Operation Modification that is currently under Department review. Geraghty & Miller maintain that the cap alone will be effective in achieving significant dewatering of the fill material, thereby reducing the mobility of contaminants within the waste. They believe that the cap will isolate the contaminants from any potential human contacts and the perimeter collection system will intercept any contaminated liquid before it can be released.

A soil vapor extraction system would consist of a series of subsurface wells installed within the waste and above the water table. These wells would be hooked up to a central vacuum blower that draws VOCs out of the soil. The exact construction and placement of these systems is further detailed in Kohler's October 10, 1994 Remedy Analysis letter. The SVE systems are only proposed for 3 limited areas of the landfill where old liquid waste disposal pits were once located. After the VOCs have been removed, they could be vented to the atmosphere or treated. While this would reduce the mass of VOCs within the vadose zone of the fill, it would produce minimal effects on ground water quality.

Kohler believes that it is appropriate to establish federal ACLs at the Kohler site because they believe that continued discharge to the river presents no significant threat to health, welfare, or the environment. How the site would meet the criteria for the establishment of ACLs or at what levels the ACLs would be set is not clearly spelled out. Kohler has indicated that they prepared and submitted a document to the U.S. EPA in April of 1992 that they believe spells out the criteria required for the establishment of ACLs at the Kohler site.

The report also proposes a long term monitoring program to assess the effectiveness of the remedial action and the contaminant levels present in the ground water. This program would include semi-annual VOC sampling at 10 wells and annual sampling for all identified compounds of concern at 17 additional site wells. The program would be evaluated after 2 years of monitoring and changes would be made if needed.

REVIEW COMMENTS

ECA Report

After reviewing the report, the Department is in general agreement with Geraghty & Miller's assessment of the geologic and hydrogeologic conditions present at the landfill. The evidence of three different hydrogeologic units, the upper unit and the lower unit being effectively separated by the presence of the low permeability middle till unit, is a reasonable interpretation of the data presented. The measured hydraulic heads supported by the ground water flow models indicate that the Sheboygan River is a local ground water discharge point. Geraghty & Miller's models also indicate that the river captures the upper aquifer discharge and a portion of the discharge from the upper part of the lower aquifer.

It appears that, prior to 1980, wastes that would be considered hazardous under current federal and state definitions were disposed of within the landfill. It also appears that compounds originating from these wastes have migrated vertically into the upper, middle and lower till units as well as the shallow bedrock. The most contaminated areas, especially with respect to VOCs, appear to occur in the Old Waste Pit, the Southern and Northern Burn Pits and other small areas where waste sludges were disposed of in the past.

The subsurface conditions present within the fill area were not completely characterized. There were only a limited number of soil borings completed through the fill area and there are even fewer monitoring wells within the limits of waste. The nature of the fill/till or alluvium contact, the continuity of the till units and the chemical characteristics of the shallow ground water beneath the fill were not fully defined, especially in the northern and western portions of the landfill.

RAA Report

The majority of our comments concern the remedial actions proposed by Geraghty & Miller as part of the remedial actions alternatives (RAA) portion of this report. As mentioned earlier in this approval, after evaluating all the potential remedial options, the consultant recommended an alternative consisting of the source control clay cap, an SVE system, continued monitoring and establishment of ACLs. There are many issues that need to be further explained or modified before the Department can select the most appropriate final ground water remedial alternative.

Ground Water Model

A series of ground water modelling results form the basis of Geraghty & Miller's recommended plan for ground water remediation at the Kohler site. The models indicate that placement of the cap would significantly reduce the ground water heads within the landfill. The water table is predicted to drop a total of 4 to 6 feet after a period of 10 years. Because the average saturated fill thickness was calculated to be less than 7 feet, Geraghty & Miller believe that the water table decline after 10 years would be sufficient

to dewater a majority of the fill material. This would then result in a reduction in the mobility of some compounds into the ground water.

The Department believes that some parameters used in the models are overly optimistic. Based on the model's cap design, Geraghty & Miller calculated that the evapotranspiration would be 24.9 inches/year, lateral drainage would be 3.8 inches/year, percolation through the clay cap would be 1.0 inches/year, and that would result in only 0.3 inches/year of percolation to the base of the fill after closure. Kohler attempted to justify the parameters used in the model in their April 27, 1994 reply letter by providing a detailed explanation of their ground water flow model. However, the Department's comments are on the assumed efficiency of the cap design, not on the ground water base flow calculations.

Based on past experiences with clay caps installed over other landfills, the Department believes that the infiltration rate through a two foot clay cap should be in the range of 3 to 6 inches per year. These figures are supported by calculations made on other landfill caps using the U.S. EPA's Water Balance Equation.

ACLs

Consistent with the establishment of ACLs under the federal CERCLA process and current U.S. EPA guidance, (please refer to the DNR memorandum dated February 17, 1995 authored by Gary Edelstein) the Department requires that all s. NR 140.28(2) Wis. Adm. Code criteria must be satisfied prior to considering CERCLA ACLs for any contaminants of concern in downgradient wells. The remedial alternatives contained in the attached plan modification must be fully evaluated and a remedial action implemented through a ROD before the Department can determine whether or not the s. NR 140.28 Wis. Adm. Code requirements have been satisfied.

Kohler Company's Selected Remedy

As explained earlier, the Department believes that the projected performance of the landfill cap is overly optimistic. Even if the landfill cap worked exactly as predicted by the models (i.e. percolation of 1 inch/year), large sections of the most significantly contaminated areas would remain saturated after 10 years. The model shows that in the area of the Old Waste Pit, the water table will have dropped approximately 4 feet within 10 years of placement of the cap. However, the report also indicates that there is currently between 5 and 15 feet of saturated waste at this location. Some parts of the Northern Burn Pit contain approximately 13 feet of saturated waste. Even after 10 years of water table decline, some contaminated areas will still have 10 feet or more of saturated fill. The Department feels that the presence of saturated fill even 10 years after the placement of the clay cap is an indication that contaminant sources will not be fully under control. Ground water flow through or infiltration from beneath the fill will result in a continued mobilization and transport of contaminants into the ground water system. This is not acceptable under NR 140 Wis. Adm. Code, which does not allow time discretion for control of the contaminant source.

The models also work on the assumption that only the fill thickness needs to be dewatered to adequately isolate the ground water from contaminants. As it has been noted in the report, the upper till unit and the alluvium have hydraulic conductivities similar to the fill material, and all three deposits are in hydraulic communication with one another. Although the information concerning the condition of the soils and water within the upper till unit and the alluvium beneath the fill is limited, there is evidence that the contaminants have migrated vertically into these units. These units, especially in areas beneath the waste pits, would then continue to act as a contaminant source for the ground water long after the fill has been totally dewatered.

There are two major limitations to the use of an SVE system for the purpose of ground water contaminant source control. As we discussed earlier, large portions of the most contaminated fill areas will remain saturated, even after placement of the cap. The SVE system only works to extract VOCs from the vadose zone, the unsaturated portion of the waste, and has no effect on VOC contaminant concentrations below the water table. These contaminants will continue to leach into the ground water beneath the fill area.

SVE's other drawback is that it is only effective at removing VOCs. It has been shown that the waste fill contains high levels of chromium, lead, copper, zinc, sulfate, chloride and other inorganic compounds that would be totally unaffected by the proposed SVE system. Because of the persistent saturated conditions, these contaminants would continue to impact the ground water quality of the area. The SVE system would only have very limited effect on concentrations of semi-volatiles such as phenols and PCBs.

As proposed, the Department believes that the SVE system would be operated for too short a time period and would be too limited in scope to have a significant effect on contaminants within the bulk of the waste mass. The system would only have limited impact on vapor-phase VOC concentrations beyond the waste pit extraction zones and persistent saturated conditions within some of the waste pit areas would further limit SVE system's effectiveness. Kohler's April 27, 1994 reply to these issues was that, "...constituents which may potentially migrate from the fill materials are captured by the Sheboygan River...are diluted by the river, (and) do not pose risk to human health and the environment...". Kohler did not directly dispute the limitations of the SVE system outlined by the Department or give any details as to how these limitations could be overcome.

Kohler also stated in their April 27, 1994 letter that 90 percent of the VOC waste mass is concentrated in 4 discrete areas and, therefore, a sitewide extraction system is not needed. What was not addressed was the overall effectiveness of the proposed system (how much VOC waste mass would be removed), a justification for shutting down the system after only 3-5 years of operation, and why only 3 areas were proposed for SVE systems in the October 10, 1994 Remedy Analysis letter instead of the 4 areas mentioned earlier.

Source Control Perimeter Drain

The perimeter drain system, as proposed in the ECA report, was apparently designed to "...relieve hydraulic pressure from within the fill materials." and to "...provide(ing) a path for potential leachate to escape the fill material...". There do not appear to be any provisions for either collecting or treating this leachate that likely would contain significant amounts of contaminants. As proposed, the contaminated leachate would either infiltrate into the ground or flow directly into the Sheboygan River. These problems could be mitigated by redesigning the drain system so that the drains are placed below the water table and their flows are directed to sumps where the liquids would be pumped out for treatment and disposal. This issue was addressed further in the August 29, 1995 Source Control plan modification for the Kohler Landfill.

Installation of the perimeter drain would also destroy a large number of monitoring wells which would have to be relocated to the east of the drain. This would reduce the wells' ability to monitor the effectiveness of the remedial action. Kohler proposed that berms be built around each well, but it is unclear whether this is practical, desirable, or how it would affect the performance of the perimeter drainage system. Again, this issue was addressed in the August 29, 1995 source control plan modification. Kohler will be required to properly abandon and replace any wells affected by construction of a perimeter drain system.

Monitoring

The long term monitoring plan, as presented in the report, is inadequate to determine the effectiveness of the remedial action. The 10 wells that would be monitored for VOCs on a semi-annual basis are mostly deep wells located on the other side of the Sheboygan River, a hydraulic barrier for the upper aquifer units, or upgradient of the landfill. The remaining 17 wells would only be sampled once a year for the compounds of concern. Although the model shows that, under ideal conditions, it would take nearly 10 years to establish a maximum steady state condition within the fill area after closure and capping, the report proposes to reevaluate the monitoring system after only 2 years of data collection. To address this issue, the Department modified the ground water monitoring system through the August 29, 1995 source control plan modification. The monitoring system will be further modified by the Department, if needed, during preparation of the remedy selection plan modification and draft ROD.

CONDITIONAL PLAN APPROVAL

Kohler will be required to evaluate several different options designed to build upon the source control remedy specified in the ROD and add elements designed to address ground water contamination. The Department reviewed 10 different ground water remedial alternatives in the January 20, 1995 letter to the Kohler Company. Of the 10 alternatives, it is the Department's opinion that none of the first 5 alternatives alone would comply with NR. 140 Wis.

Adm. Code. However, the alternatives numbered 6 through 10 in the letter were found to have potential for meeting the intent of NR 140 Wis. Adm. Code requirements.

Alternatives 6 through 9 must each be evaluated to determine their technical and economic feasibility. Alternative #10 is essentially the same as Alternative #9 with the addition of a deep ground water extraction system. Contaminants present in the deep aquifer system must be addressed in conjunction with any of the previously mentioned alternatives.

Each alternative must be evaluated to determine their effectiveness at preventing new contaminant releases to the ground water. The Department believes that hydraulic control, as included in alternatives 6-9, is an important element of the source control remedy. In addition, the Kohler Company must evaluate the technical and economic feasibility of each alternative to restore ground water quality downgradient of the landfill to PAL levels within a reasonable period of time. If Kohler determines that it is not technically and economically feasible to restore ground water quality through the implementation of alternatives 6 through 9, they must document why each alternative is not technically and economically feasible. Kohler must also provide information on how any liquids or vapors produced by the remedial actions would be treated and disposed.

Alternative #6 would consist of a clay cap, a SVE system in selected areas of the fill area, and a series of water recovery wells located throughout the landfill. As originally proposed by Kohler, this option would have contained 16 "fill dewatering" wells and only 2 ground water recovery wells, both located near the Old Waste Pit. Because it was determined that, as presented, this alternative is too limited in scope, the plan modification requires the Kohler Company to evaluate an expanded version of this alternative, one that includes a series of ground water extraction wells placed throughout the landfill and extending to the top of the middle till unit. The wells should be placed in such a manner, and in sufficient quantity, to effectively prevent further release of contaminants into ground water from the shallow aquifer zone by maintaining a water table level below the bottom of any fill material.

The next alternative, referred to as Alternative #7, would consist of between 6 and 18 ground water extraction wells located along the downgradient perimeter of the landfill. The wells would extend, at a minimum, to the top of the middle till unit (where present) and could be located either just outside or just inside of the waste fill limits. Some additional wells should also be considered in or near the waste pit areas to provide for some focused ground water contaminant extraction.

Alternative #8 would consist of a subsurface drain or a series of perimeter recovery wells installed downgradient of the landfill to prevent contaminated liquids from migrating beyond the waste fill limits. This alternative also includes the installation of a cut-off wall between the extraction system and the river to prevent Sheboygan River water from entering the system. This system could be designed to be flexible, so that a mixture of drains and extraction wells could be installed, dependant on which system is the most

effective at any given length of the landfill perimeter. As with the wells described in Alternative #7, the subsurface drain would extend to the top of the middle till unit or, alternatively, extend deep enough into the upper aquifer to induce ground water gradients from the length of the upper aquifer inward toward the drain system.

Alternative #9 would contain the same design elements as Alternative #8, above, but would add the installation of an upgradient cut-off wall. Installing an upgradient slurry-type cut-off wall may accelerate dewatering of the fill mass and may also increase the long term effectiveness of the perimeter water extraction systems.

All of the remedial alternatives described above deal solely with contaminants present within the upper aquifer. However, it has been shown that contaminant levels exceeding the NR 140 Wis. Adm. Code standards are present within the deeper aquifer system as well. In order to adequately address these contaminants, the Kohler Company will be required to evaluate remedial options for the deeper lower till and bedrock aquifers as well. It may be possible to achieve remediation through the careful placement of a series of high-capacity extraction wells. If, however, the Kohler Company can show that extracting and treating contaminants from the deep ground water aquifer would be impractical, detailed justification as to why this option is not technically and economically feasible must be submitted to the Department.

Any remedial alternative that will extract either contaminated liquids or air must contain some provisions for their treatment and ultimate release into the environment. The plan modification requires that the Kohler Company evaluate several different options for dealing with contaminated fluids and air. In accordance with the Department's March 22, 1994 letter to the Kohler Company, any discharge of contaminated ground water into the Sheboygan River must meet either the water quality based limits or the BAT limits, whichever is most stringent. If the contaminated liquids were discharged to either the Sheboygan POTW or the Kohler Company Water Treatment Plant, the discharges would be regulated under their existing permits. Air discharges would be subject to the Department's Air Management Bureau regulations.

All of the ground water and vapor extraction systems to be evaluated in the alternatives must be designed and operated to prevent new releases of contaminants to the ground water in concentrations that cause ground water standards to be exceeded. The goal of the ground water source control remedy is to meet PALs at the edge of the waste fill limits unless it is shown not to be technically or economically feasible. The ground water quality enforcement standards must be met at the waste fill limits regardless of the feasibility of achieving PALs.

Alternatives 6 through 9 are the minimum number of alternatives that must be evaluated as part of this plan modification. If there are other alternatives identified by the Kohler Company that combine these or other remedial elements, they may also be investigated for their technical and economic feasibility and included as part of the required analyses. One alternative the Kohler Company may want to consider is the excavation and treatment or

disposal of soils in the most contaminated areas, especially the Old Waste Pit. This option would be more effective at removing potential ground water contamination sources than relying solely on more indirect methods of extraction and treatment such as SVE and focused ground water extraction.

The Department is evaluating concerns regarding the potential for impacts to the Sheboygan River resulting from contaminated ground water discharge from the landfill. The results of this evaluation will be used to help determine the most appropriate remedial alternative for the landfill and the most appropriate timeframe for remediation of the contaminated ground water plume. If the Department determines that a shorter timeframe for restoration of the ground water aquifers is necessary, the selected hydraulic source control alternative may be modified by the addition of certain design elements or by an increase in the rate and efficiency of contaminated ground water extraction.

There are many benefits to installing a series of extraction wells extending to the top of the middle till unit either within the fill or along the landfill perimeter. First of all, this system would intercept and treat the most contaminated liquids from the landfill and prevent them from migrating to the lower aquifer or the river. It would enhance the effectiveness of the middle till unit to act as a hydrogeologic barrier by reducing the thickness of the hydraulic head above the unit. A liquid extraction system would be effective at removing VOCs, metals and semi-volatiles. All this can be built utilizing proven, existing technology that is currently in use at many landfills throughout the state. This system would reduce the pressure of liquid against the eastern portion of the landfill cap, especially at the toe, and lessen the chances of seeps or slumps forming.

A subsurface drainage system, extending to the base of the alluvial unit, would have many of the same advantages as the perimeter extraction well design with the added benefit of requiring less maintenance. Instead of being driven by mechanical pumps, the system would be driven more by gravity and the natural ground water gradients near the base of the landfill.

The effectiveness of the liquid extraction system would be enhanced by installing vapor extraction systems to extraction wells completed within the waste mass. This system would be effective at collecting VOCs from the vadose zone and help prevent the build-up of gas pockets beneath the clay cap once it is in place. The vapor gas would need to be collected and vented to the atmosphere or treated. As with the extraction wells, the advantage of this system is that it utilizes proven, existing technology.

We also suggest that Kohler revisit the source control ROD if any of these additional elements are to be included as part of the final remedy for the Kohler site. This would insure that all the design elements are compatible. Some design elements may need to be reconfigured to accommodate the extraction systems.

Geraghty & Miller's November 22, 1993 letter contained a list of monitoring wells that they proposed to abandon. The Department has evaluated this list

and addressed the issue in the August 29, 1995 source control plan modification.

If you have any questions or comments concerning this letter or the plan modification, please contact Jack Connelly, Groundwater Assessment Unit Leader, at (608) 267-7574.

Sincerely,

Lakshmi Sridharan

Lakshmi Sridharan, Ph.D, P.E., Chief
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

cc: Paul Didier - SW/3
Kevin Kessler - SW/3
Mark Giesfeldt - SW/3
Jane Lemcke - SW/3
Jack Connelly - SW/3
Bob Grefe - SW/3
Philip Fauble - SW/3
Roger Klett - SED
Steve Padovani - U.S. EPA, Region 5, Chicago
Anthony Earl -
Kathleen Duchac - Geraghty & Miller, Inc.

BEFORE THE

STATE OF WISCONSIN

DEPARTMENT OF NATURAL RESOURCES

CONDITIONAL PLAN MODIFICATION FOR THE

KOHLER COMPANY LANDFILL

DNR LICENSE 01508

FINDINGS OF FACT

The Department finds that:

1. The Kohler Company owns and operates a non-approved solid waste disposal facility in the NE 1/4 of the SE 1/4 of Section 29, T15N, R23E, Village of Kohler, Sheboygan County, Wisconsin. The facility currently accepts non-hazardous industrial wastes, primarily foundry sand and pottery cull, generated at the Kohler Company plant.

2. On February 10, 1971, the Department issued the initial operating license for the Kohler Company Landfill.

3. On August 30, 1976, the Department issued an approval of a plans and specifications report, submitted by the Kohler Company on May 19, 1976, for the Kohler Company Landfill (referred to then as the Kohler Company Foundry Sand Disposal Site).

4. On March 10, 1981, a Plan Approval Addendum was issued by the Department to address a number of problems observed at the site, including apparent ground and surface water contamination.

5. On May 10, 1982, a Plan Approval Addendum concerning ground water monitoring, waste characterization, and the submittal of an annual report was issued by the Department.

6. In response to two meetings with representatives of the Department on June 10, 1992 and July 13, 1992, Geraghty & Miller, Inc., on behalf of the Kohler Company, submitted a report titled, "Environmental Contamination Assessment And Ground Water Remedial Action Alternatives Report" to the Department. This report was received on November 16, 1992.

7. In response to the requirements of a Record of Decision entered into by the Kohler Company, the U.S. EPA and the Department on March 30, 1992,

Geraghty & Miller, Inc., on behalf of the Kohler Company, submitted a proposed Plan of Operation Modification to the Department on December 22, 1992. The proposed plan modification details the placement of a clay cap after final closure of the facility and the installation of a toe drain collection system.

8. On December 3, 1993, the Department issued a Draft Plan Modification for review by the Kohler Company. The Draft Plan Modification contained conditions requiring the Kohler Company to further evaluate certain remedial alternatives and to establish a long-term ground water monitoring program.

9. The Kohler Company responded to the Draft Plan Modification in a letter to the Department dated April 25, 1994. The Kohler Company accepted the ground water monitoring program as proposed but maintained that additional remedial alternative evaluations were unnecessary.

10. On October 10, 1994, the Kohler Company submitted a Groundwater Operable Unit Remedy Analysis dated October 7, 1994, to the Department in response to a meeting between Department and Kohler Company representatives that took place on August 18, 1994 in Madison, Wisconsin.

11. The Department sent a letter to the Kohler Company on January 20, 1995 in response to the Kohler Company's Remedy Analysis letter. The Department outlined 10 possible ground water remedial alternatives for the Kohler Company Landfill and requested that the Kohler Company further evaluate 5 alternatives, described as Alternatives 6, 7, 8, 9, and 10, that had potential to meet ch. NR 140 Wis. Adm. Code requirements.

12. The Department sent a letter to the Kohler Company on February 24, 1995 summarizing a series of meetings concerning the Kohler Company Landfill held on February 6, February 9 and February 20, 1995.

13. At the Kohler Company's request the Department sent a letter granting Kohler an extension for the comment period for the draft plan modification until May 30, 1995. The Department's letter also allowed Kohler to split the remedial alternatives analysis into a source control remedy and a plume management remedy with the understanding that both remedial elements must be addressed.

14. On April 26, 1995, the Kohler Company submitted a report to the Department titled, "Addendum To Environmental Contamination Assessment And Groundwater Remedial Action Alternatives Report, Kohler Company Landfill, Koher (sic), Wisconsin" in partial fulfillment of the conditions of this plan modification. The report evaluates the five remedial alternatives contained in this plan modification only in regards to their ability to control new releases of contaminants from the landfill to the ground water (source control).

15. The Kohler Company submitted their response to the draft plan modification to the Department on May 30, 1995.

16. The Department issued a plan modification for the Kohler Landfill source control remediation design on August 29, 1995. The plan modification contains construction details for a multilayered final cover system, construction of a perimeter drain, and the implementation of an updated ground water monitoring system.

17. On August 31, 1995, Jim Schmidt of the Department's Water Resources Management Bureau prepared an internal memorandum concerning the evaluation of silver test results from ground water samples near the Kohler Landfill site.

18. The Department considers the following facts to be significant in it's decision:

    a. The facility has been in use since the 1950's and is unlined. Between the 1950's and 1980, the facility was used for the disposal of various RCRA-defined hazardous wastes including solvents, paint wastes, enamel powder and chrome plating sludges. Hazardous waste liquids were disposed of in unlined pits dug into foundry sand wastes within the landfill.

    b. Ground water investigations conducted by the Kohler Company and the U.S. EPA have indicated the presence of numerous compounds in monitoring wells downgradient of the facility in concentrations that exceed the Preventative Action Limits (PALs) and Enforcement Standards (ESs) as defined in s. NR 140.10 and NR 140.12, Wis. Adm. Code.
    PAL and ES exceedences have been detected in the following monitoring wells:

    1-B, 2-D, 2-DR, 2-SR, 3, 3-D, 3-R, 3-SR, 3-DR, 4, 4-D, 5, 5-D, 8-R, 8-D, 8-SR, 8-DR, 9, 9-D, 11, 11-D, 13, 13-R, 13-SR, 14, 14-SR, 15-SR, and 16-SR.

    The following compounds have been detected in site monitoring wells in concentrations that exceed the PALs and/or ESs:

    vinyl chloride, toluene, 1,2-dichloroethene, trichloroethene, benzene, 1,1-dichloroethane, 1,1,1-trichloroethane, 1,1-dichloroethene, nitrate-nitrite, cadmium, chromium, silver, fluoride, barium, sulfate, iron, and manganese.

    The specific exceedences, their location and the date of their occurrence, are all detailed in Geraghty & Miller's November 16, 1992 Environmental Contamination Assessment (ECA) report.

    c. A portion of the facility is located within the pre-development floodplain of the Sheboygan River and ground water flow models indicate that most contamination present within the upper aquifer

is eventually discharged into the river. It appears that some contamination from the facility is migrating vertically into a bedrock aquifer that is utilized as a water supply source for private wells in the area.

CONCLUSIONS OF LAW

1. The Department has authority to require a response under s. 160.23, Stats., and s. NR 140.24(4), Wis. Adm. Code, if a Preventative Action Limit for a substance of public health or welfare concern has been attained or exceeded at a point of standards application.

2. The Department has authority to require a response under s. 160.25, Stats., and s. NR 140.26(2), Wis. Adm. Code, if an Enforcement Standard for a substance of public health or welfare concern has been attained or exceeded at a point of standards application.

3. In accordance with the foregoing, the Department has authority under s. 144.44(3), ss. 160.23 and 160.25, Stats., and ss. 140.24 and 140.26, Wis. Adm. Code, Ch. NR 500-520, Wis. Adm. Code, to issue the following conditional plan modification, which requires responses to exceedences of ground water standards.

4. The Department has authority to impose monitoring requirements under ss. 144.435 and 144.44, Stats., and ch. NR 508, Wis. adm. Code, for any non-approved facility, as defined under s. 144.441(1)(c), Stats.

CONDITIONAL APPROVAL

The Department hereby modifies the Plan Approval dated August 30, 1976 for the Kohler Company Landfill (License #01508) by adding the following conditions:

1. The Kohler Company shall provide further detailed evaluation of several remedial options for the landfill including an evaluation of the technical and economic feasibility of each option. The evaluation shall include remedial methods designed to actively extract liquid from the fill and upper till/alluvium unit. At a minimum, the Kohler Company shall further evaluate the following options:

   a. Alternative #6 - Installation of a series of ground water extraction wells, each extending to the top of the middle till unit, throughout the waste fill area and the installation of soil vapor extraction systems at selected locations throughout the fill area. The evaluation shall contain a justification of the location and number of extraction wells and vapor extraction systems along with supporting data and calculations.

   b. Alternative #7 - Installation of between 6 and 18 ground water extraction wells, each extending to the top of the middle till unit, or the base of the alluvium deposits if the middle till is

absent, to be located along the downgradient (with respect to ground water flow) perimeter of the landfill. The evaluation shall contain a justification of the location and number of extraction wells with supporting data and calculations.

c. Alternative #8 - Installation of a subsurface drain system and/or ground water extraction wells around the downgradient (with respect to ground water flow) perimeter of the landfill. A cut-off wall, tied into the middle till unit where present, shall be designed for installation between the extraction system and the Sheboygan River.

d. Alternative #9 - Installation of an extraction system and downgradient cut-off wall as described in Alternative #8, above, with the addition of an upgradient (with respect to ground water flow) cut-off wall designed to divert horizontal ground water flow around the landfill area. The evaluation shall contain some discussion concerning what effects placement of an upgradient cut-off wall will have on horizontal ground water flow into the landfill and the downgradient ground water collection system.

2. The Kohler Company shall also evaluate alternatives for the remediation of contaminated ground water present in the deep aquifer system, which includes the lower till unit, shallow bedrock and deep bedrock. At a minimum, the Kohler Company shall evaluate the technical and economic feasibility of installing a series of deep ground water extraction wells to remove contaminated ground water from these units.

3. Any ground water or vapor extraction system evaluation shall contain provisions for operation of the system(s) until such time as either:

   a. The ground water quality preventive action limits (PALs) contained in NR 140 Wis. Adm. Code can be met at the edge of the waste boundaries, or

   b. The ground water quality enforcement standards (ESs) contained in NR 140 Wis. Adm. Code are met at the edge of the waste boundaries and it is shown that achieving PALs at the edge of waste is neither technically nor economically feasible.

4. In conjunction with the remedial action alternatives evaluations required in Conditions 1 through 3, the Kohler Company shall also evaluate treatment and disposal options for any contaminated liquids or vapors extracted from the landfill. At a minimum, the following options shall be evaluated:

Water Treatment

   a. Disposal of untreated liquid waste water directly into the nearest Publicly Owned Treatment Works (POTW) system;

b. Pretreatment of the liquid waste water in on-site pretreatment units (carbon filtration systems, air strippers, etc.) prior to ultimate disposal at the POTW;

c. Pretreatment of the liquid waste water at the new Kohler Company wastewater treatment plant prior to ultimate disposal at the POTW;

d. Either pretreatment option described in Condition b. or c., with ultimate disposal directly into a surface water;

Air Treatment

e. Discharge of any extracted vapors directly into the atmosphere;

f. Pretreatment of any extracted vapors utilizing appropriate on-site pretreatment units (carbon filters, flares, etc.) before discharge to the atmosphere.

The treatment and disposal options analyses shall include a summary of any applicable permits or discharge limits that would have to be in place prior to implementation. The analyses shall also include an estimate of the anticipated discharge amounts as well as an evaluation of the technical and economic feasibility of each option.

5. The results of the evaluations required in Conditions 1 through 4 shall be included in a report, to be prepared by the Kohler Company, that will take the form of an addendum to the November 16, 1992 ECA and Ground Water Remedial Action Alternatives Report. This addendum report shall be submitted to the Department within 3 months of the date of this plan modification.

The Department reserves the right to require the submittal of additional information and to modify this approval at any time, if in the Department's opinion, modifications are necessary. Unless specifically noted, the conditions of this approval do not supersede or replace any previous conditions of approval for this facility.

NOTICE OF APPEAL RIGHTS

If you believe you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to sections 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

This notice is provided pursuant to section 227.48(2), Stats.

Dated: SEP 6 1995

DEPARTMENT OF NATURAL RESOURCES
For the Secretary

Lakshmi Sridharan

Lakshmi Sridharan, Ph.D, P.E., Chief
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

Philip Fauble

Philip Fauble, Hydrogeologist
Solid Waste Management Section
Bureau of Solid and Hazardous Waste Management

Robert P. Grefe

Robert P. Grefe, P.E.
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

plancond

ATTACHMENT 7 - **Public Outreach**

Wisconsin Department of Natural Resources to Conduct Review of Kohler Company Landfill

The Wisconsin Department of Natural Resources in consultation with the U.S. Environmental Protection Agency is in the process of reviewing the Kohler Company Landfill Superfund Site. The Superfund Law requires a review at least every five years at sites were cleanup action has been started but regulated substances remain on-site. These reviews are done to ensure the cleanup continues to protect human health and the environment. A review was previous done in 2002.

This review will include an evaluation of background information, cleanup requirements, effectiveness of the cleanup, and any anticipated future cleanup actions. The Wisconsin Department of Natural Resources and the United States Environmental Protection Agency selected several cleanup actions in 1992 and 1996:

1. Closure of the landfill.
2. Construction of a clay cap over the waste mass in accordance with State solid waste regulations.
3. Collection, treatment and discharge of landfill leachate via a perimeter drain collection system.
4. Operational and surface controls for the remaining period of landfill operation.
5. Access and use restrictions on the property.
6. Installation of a perimeter drainage system along the eastern and southern toes of the waste mass to intercept all contaminated liquids originating from the landfill.
7. Discharge of all liquids collected from the perimeter drain system into a force main connected to the City of Sheboygan wastewater treatment plant for treatment and disposal.
8. Use of monitored natural attenuation to achieve groundwater cleanup levels in areas beyond the perimeter drain.
9. Groundwater monitoring of existing and newly installed monitoring wells on the Kohler Company property.
10. Five-year site reviews to assess site conditions, contaminant distributions, and any associated site hazards.

An Explanation of Significant Difference was issued on September 28, 1998. The original source control Record of Decision did not address that fact that the landfill would remain open until it reached final grades estimated to occur in the year 2011. The Kohler Company had placed final cover on over 50 percent of the landfill and proposed phasing in construction of the balance of the landfill cap as filling reached final grades. EPA approved the recommended change. The primary changes documented in the Explanation of Significant Difference were:

1. Permitting continued non-hazardous waste filling within the limits of the existing landfill.
2. Phased construction of the clay cap as the landfill reaches approved final grades.

Construction of the clay cap on 50% of the landfill was completed on August 12, 1998. Installation of a drainage system along the eastern and southern toes of the waste the cap, and the force main to the City of Sheboygan wastewater treatment plant were completed December 1, 1997.

The second five-year review report, which details the site's progress, will be completed in September 2007. At that time the report will be available at the site's official document repository, which is located at:

Kohler Public Library
230 School Street
Kohler, Wisconsin 53044

Additional information may be obtained by contacting:

Thomas A. Wentland
Wisconsin Department of Natural Resources
1155 Pilgrim Road
Plymouth, WI
920-892-8756 Ex. 3028

WNAXLP